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THE

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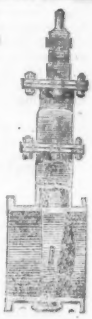

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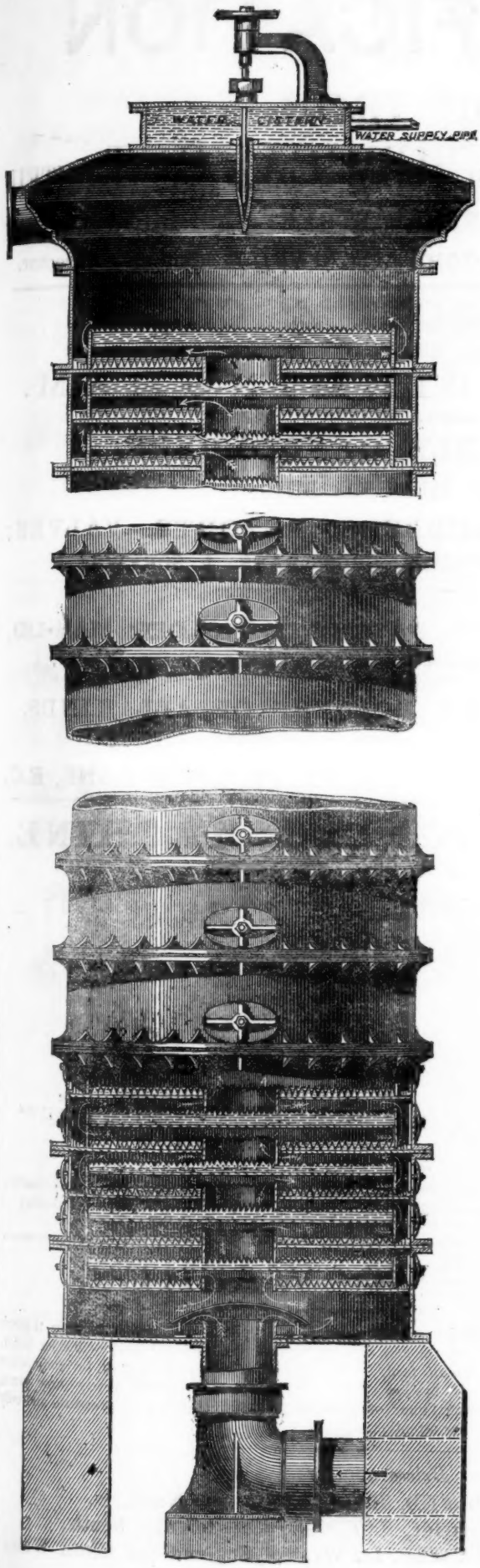

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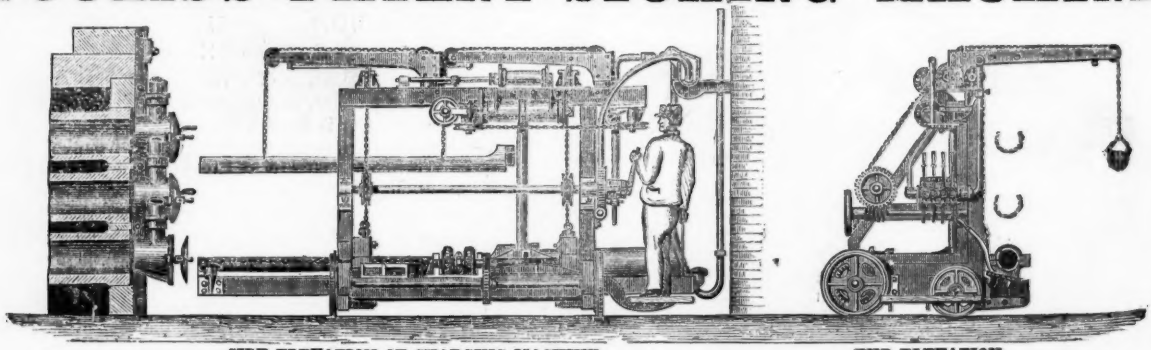

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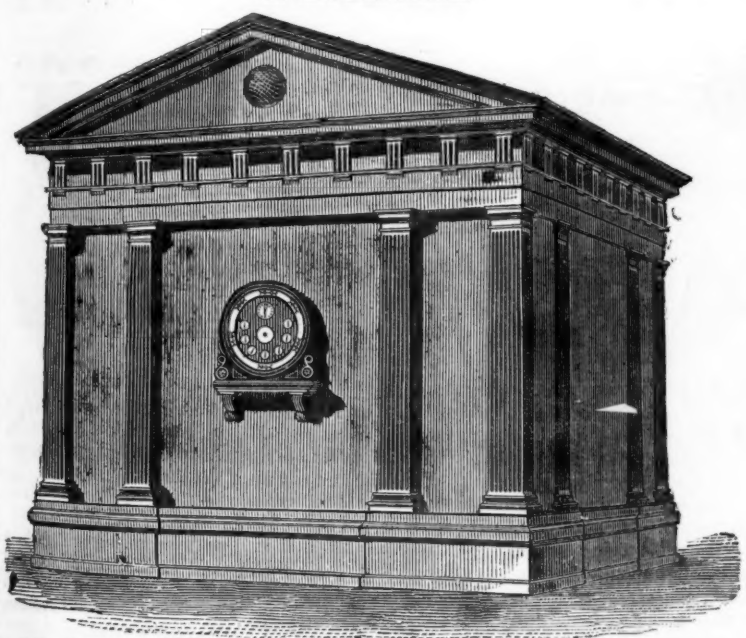

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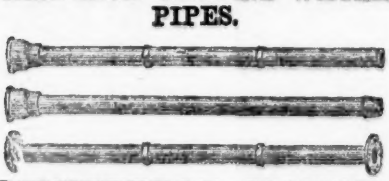

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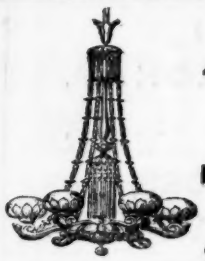

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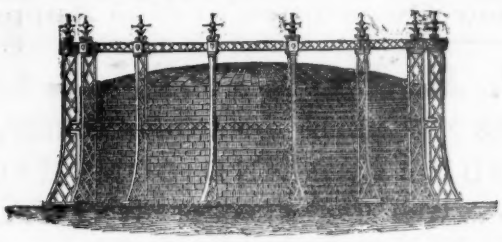

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VALVE, with Indicator or Above Ground. UNDERGROUND VALVE.

The advantages of this Patent Valve over all others yet introduced are, that it is always as tight as the best wedge or spring valve, without the possibility of setting fast or becoming suddenly leaky. The surfaces not being in contact during the operation of opening or closing, leakage through wear and tear is avoided.

The Gas Engineer will not fail to see the importance of such a valve in connexion with his purifying apparatus, particularly in the case of large sizes.

The slide being operated either by a screw and nut, or by a pinion and rack, a cam bearing upon a plane, cast on the back of the Valve, forces it against the face, and renders the escape of gas an impossibility. By a slight turn of the pinion or screw, the slide is released, and brought away from the face, by which means friction is avoided, and the only force required to open the Valve is that due to its own weight.

SOLE MANUFACTURERS:
S. OWENS AND CO.,
HYDRAULIC AND GENERAL ENGINEERS,
WHITEFRIARS STREET, LONDON, E.C.
PRICES, SIZES, AND FULL PARTICULARS ON APPLICATION.

TANGYE BROTHERS AND HOLMAN,

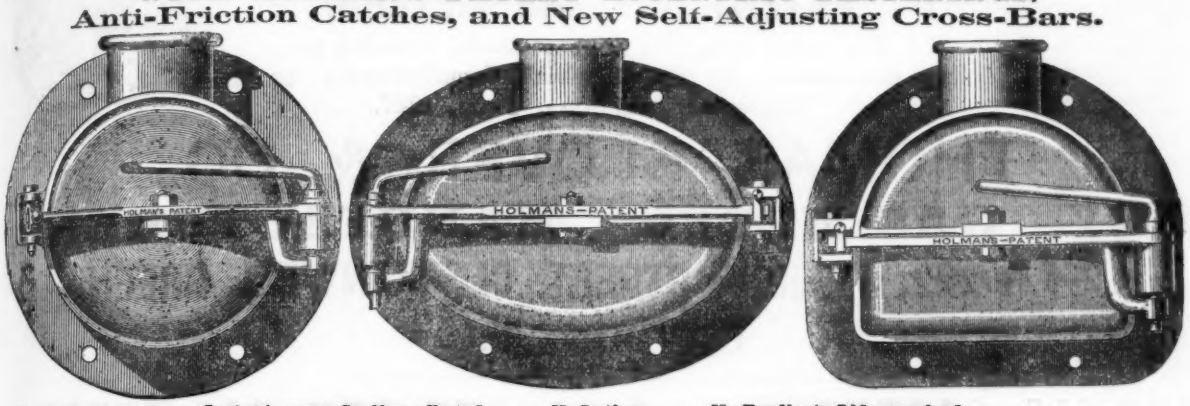
CORNWALL HOUSE, 35, VICTORIA ST., LONDON, E.C.

(LATE OF 10, LAURENCE POUNTNEY LANE.)

SOLE MAKERS OF MORTON'S PATENT SELF-SEALING RETORT-LIDS,

WITH HOLMAN'S PATENT ECCENTRIC FASTENINGS,

Anti-Friction Catches, and New Self-Adjusting Cross-Bars.



Instantaneous Sealing effected. No Luting. No Duplicate Lids required.

Holman's New Self-Sustaining Cross-Bar ensures freedom of Joint, and maintains parallel position of the Lids.

Since their introduction in 1869, these Patent Retort-Lids have been thoroughly tested, being now in use in nearly all the principal Gas-Works in London and the Provinces.

T. B. and H. are now making the "Morton's Self-Sealing Lid" of the SAME FORM OR SECTION AS THE RETORT (see Illustrations above), as well as bringing the Mouthpiece from the D or Oval at back to Circular in front, as heretofore.

D and Oval Morton's Lids are working satisfactorily both in this country, on the Continent, and in the United States of America. Among others they have been adopted by the following Gas-Works:—

The Gaslight Company's Works, Fulham; Ditto, Bromley-by-Bow; Ditto, King's Cross; Ditto, Shoreditch.
And also in the Gas-Works at Richmond, Maidstone, Gloucester, Glasgow, Portsea, Roubaix (France), The Hague (Holland

HUNT'S PATENT EQUILIBRIUM GAS-GOVERNOR.

In this Governor a Throttle-Valve is substituted for the ordinary suspended Cone, all external communications being avoided by placing the Lever or Radius Arm (shown in the drawing) inside the Valve-Chamber upon the Disc. The Disc is carried upon steel centres, upon which it is accurately balanced and turns freely. The friction in working is thereby reduced to a minimum. This Governor is extremely sensitive to alterations of inlet or outlet pressure, and renders a large actuating holder unnecessary.

The principal advantages of this arrangement over the ordinary form of Governor are as follows:—

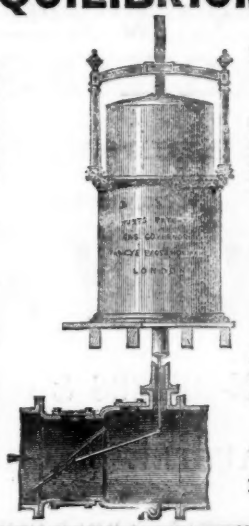
Its sensitive action prevents oscillation.

It is self-adjusting—*i.e.*, it maintains a steady pressure under variations of inlet pressure or a fluctuating consumption.

The inlet to Gasholder being contracted to the smallest possible dimensions, all danger from leakage through insufficiency of seal, tilting, &c., is entirely avoided.

The valve portion being separate from the holder, it can be handled and fixed like an ordinary Slide-Valve direct in the main; and the holder can be placed at an convenient distance immediately above it. The cost is thus materially reduced, and the inconvenience of heavy lifts done away with.

There are no working parts likely to get out of order.



These Governors have been adopted by many leading Gas Companies, among whom are the following:—

The Gaslight and Coke Co. (9), The London Gas Co. (3), and at Abergavenny, Arundel, Birmingham, Cannes (France), Devonport, Dursley, Exeter, Guernsey, Halesowen, Mentone (France), Monmouth, Newcastle-on-Tyne, Oxford, Plymouth, Rochdale, Windsor, &c.

TESTIMONIAL.

The Gaslight and Coke Company,
9, Water Street, New Bridge Street,
Blackfriars, E.C., Feb. 27, 1875.

MESSRS. TANGYE BROTHERS AND HOLMAN.

Gentlemen,—The two 24-inch and three 36-inch Hunt's Equilibrium Governors supplied by you, and fixed in the valve-rooms at Whitechapel, Goswell Road, and Blackfriars, are working very satisfactorily.

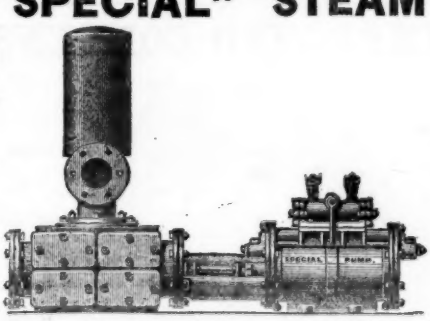
Yours truly,

(Signed) JOHN JOHNSON.

PRICES AND FULL PARTICULARS ON APPLICATION.

THE "SPECIAL" STEAM-PUMP.

Diameter of Steam Cylinder.	Diameter of Water Cylinder.	Length of Stroke.	Gallons of Water per Hour, Approximate.	Reduced Prices.
3	1½	9	450	£16
4	2	9	815	18
5*	2½	12	1,250*	20
5*	3	12	1,830*	22 10
4	4	12	3,250	25
6*	4	12	3,250*	30
5	5	12	5,070	32 10
7*	5	12	5,070*	40
6	6	12	7,330	40
8*	6	12	7,330*	50
7	7	12	9,750	50
10*	7	12	9,750*	65



In use in a Hundred Gas-Works in the United Kingdom for Pumping Ammoniacal Liquor, Water, or Tar.

Messrs. Burt, Boulton, and Haywood, Manufacturing Chemists, have over FORTY "Special" Steam-Pumps in use at their several large Tar-Works.

Two Hundred Sizes made. Those in Table opposite are the leading Sizes for use in Gas-Works and Chemical Works.

* These Sizes being usually selected for pumping Tar and Liquor, are always in stock, or nearly ready, fitted with all pump details in iron, and extra length distance-piece between steam and pump cylinder, at a small extra cost.

TANGYE'S HIGH-PRESSURE AND CONDENSING STEAM-ENGINES; CORNISH, VERTICAL, & TUBULAR BOILERS; HYDRAULIC AND SCREW LIFTING-JACKS, CRABS, PULLEY-BLOCKS, &c.

FULL PARTICULARS, ESTIMATES, CATALOGUES, ETC., ON APPLICATION.

London, 1851. New York, 1853. Paris, 1855. London, 1862.

Dublin, 1865.

The SIX MEDALS AWARDED to THOMAS GLOVER for

PATENT DRY GAS-METERS,

The latter being the Highest Medal awarded for Dry Gas-Meters by the Imperial Commissioners for the Universal Exhibition, Paris, 1867.

Paris, 1867.

THOMAS GLOVER & CO.,

DRY GAS-METER MANUFACTURERS,

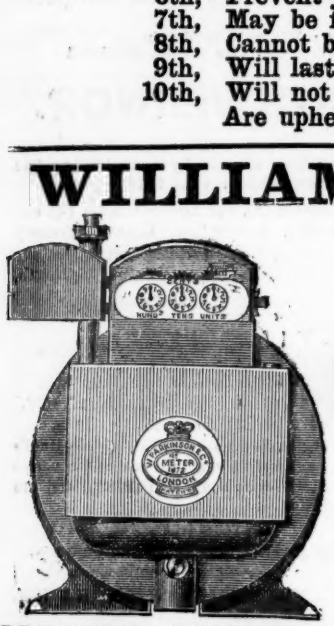
214 TO 222, ST. JOHN STREET, CLERKENWELL GREEN,

LONDON, E.C.

THOMAS GLOVER & CO.'S PATENT DRY GAS-METERS,

1st, Are a remedy for all the defects of Wet Meters;
2nd, Are suitable for all climates, whether hot or cold;
3rd, Incur no loss of Gas by evaporation;
4th, Cannot become fixed by frost, however severe;
5th, Are the most accurate and unvarying measurers of Gas;
6th, Prevent jumping or unexpected extinction of the Lights;
7th, May be fixed either above or below the level of the Lights;
8th, Cannot be tampered with, without visibly damaging the outer case;
9th, Will last much longer than Wet Meters;
10th, Will not cost more than one-half for repair that Wet or Water Meters do;
Are upheld for five years without charge.

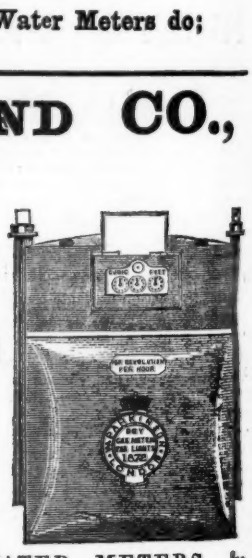
WILLIAM PARKINSON AND CO.,



(ESTABLISHED 1816,)

MANUFACTURERS OF

WET & DRY METERS,



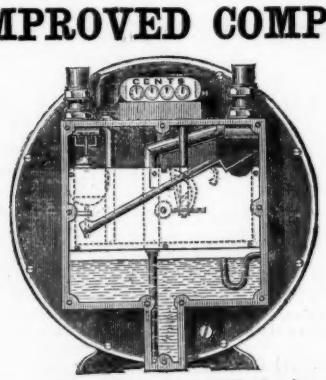
STATION-METERS & GOVERNORS,

EXHAUSTER REGULATORS,

PRESSURE REGISTERS, EXPERIMENTAL APPARATUS, GAUGES, WATER-METERS, &c.

HUNT'S PATENT IMPROVED COMPENSATING METER.

In this Meter, the action of the measuring-drum is reversed. By this arrangement an improvement is effected in the registration at high speeds, which, in many tests, has not varied from the smallest light to three times the capacity of the meter. It works equally well under all pressures. The range of error between the high and low line is much smaller than that allowed by the "Sale of Gas Act."



The Meter has been critically tested, and most favourably reported upon by official Meter Inspectors in London and Birmingham.

W. PARKINSON and CO. have made arrangements for the manufacture of these Meters, both in tin and cast-iron cases, and for the alteration of old ones to this principle, which is confidently recommended as possessing every quality that can be desired by Gas Companies, Corporations, or Private Consumers.

COTTAGE LANE, CITY ROAD, LONDON, E.C.

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TO CORRESPONDENTS.

No notice can be taken of anonymous communications. Whatever is intended for insertion, must be authenticated by the name and address of the writer; not necessarily for publication, but as a guarantee of good faith.

TO SUBSCRIBERS.

In consequence of the Easter Holidays, the next Number of the JOURNAL OF GAS LIGHTING *will not be published until Wednesday, April 24.*

THE JOURNAL OF GAS LIGHTING,

WATER SUPPLY, & SANITARY IMPROVEMENT.

TUESDAY, APRIL 16, 1878.

Circular to Gas Companies.

To mention the South Metropolitan Gas Company is only to call up in imagination the most prosperous statutory Gas Company, so far as Shareholders are concerned, in the kingdom. There are others in the country who supply gas at a cheaper rate, but who, for good or for evil, are at present deprived of the advantages which the sliding scale confers, and, therefore, do not pay more than ten per cent. The South Metropolitan are, we believe, the only statutory Company who are now dividing eleven per cent., and might, if the Directors so willed it, divide eleven and a half per cent. It is wise on their part, however, to appropriate a portion of the balance to the increase of their insurance-fund, and carry the remaining sum to the next account. We do not like to see old and familiar names disappear from the records of the management of Gas Companies, and may here express regret at the absence of the able and venerable Chairman of the Company from the meeting, which we report in another column; and also at the retirement of Mr. Beriah Drew. Both these gentlemen have done excellent service to the Company in the course of their careers, and their honest ploddings have contributed to bring the Company to its present position. But it may be that younger hands will be required to conduct the Company into the position which it might assume, as we cannot help thinking it might become the organizer of a South London combination. The time is now quite ripe for this; and, although we shall not, at the present moment, pretend to forecast the future of the Metropolitan Gas Companies, we are quite certain that their direct and permanent interest must lead in the direction of amalgamation. Towards this object the South Metropolitan Company, who have never exercised a selfish policy, might greatly contribute. We feel satisfied that the Directors will presently have this matter forced strongly upon their attention, and we shall be content to leave it in their hands. The increased remuneration of the Directors has been well earned, and we are glad to see that the Shareholders unanimously voted the additional *honorarium*.

The Sheffield United Gas Company have another prosperous undertaking which pays full dividends, and might, if the law allowed, divide more than the present maximum. Through good and evil report the Company have gone on fairly discharging their duty towards the public. A reference to the Chairman's speech will show, so far as illuminating power is concerned, how well this duty is fulfilled. The Company's Act, we believe, requires sixteen-candle gas to be supplied. When that Act was passed the Sugg-Letheby burner was in general use, and the Company continue to use that burner to the present day. According to the tests applied, both by the Company and the Corporation, the gas actually supplied considerably exceeds in illuminating power that required by the Special Act, and, if tested by the new "London" burner, as it will be when the Company again go to Parliament, the quality is enormously in excess. The Sheffield consumer may, therefore, rest well content with the gas he gets at the low rate of 2s. 9d. per thousand, and a prospect of an early reduction to something less. The considerable balance left in the hands of the Directors, after paying the half year's dividends, and the large reserve-fund, make it easy to carry into effect the proposed reduction at no distant time. That favourable coal contracts have been made is a further guarantee, and we may heartily congratulate the Sheffield Gas Company and their customers upon the happy result of the past half year's working.

The Gas Committee of the Corporation of Hereford have lost no time in reporting, on a reference made to them by the Town Council, as to the selection of a site for new gas-works. There was one ready to their hands, and they secured it. It is six acres in extent, and will cost £5000. It is estimated that to complete the gas-works, to be erected upon it, a cost of £30,000 will be incurred, which sum, as a matter of course, the Corporation propose to borrow, with the sanction of the Local Government Board, and pay off in the course of fifty years. This is not a large debt for productive works, and those who, like ourselves, are somewhat frightened at the rapidly increasing liabilities of municipalities, need not be anxious in this instance. Whether the Gas Committee have done wisely or not in purchasing second-hand plant we cannot say. The saving they have effected is comparatively small. The new works will be commenced immediately—at all events, as soon as plans for their construction have been prepared; and in the course of twelve months, we may presume, the good people of Hereford will be blessed with gas-works to last them for a long time to come.

The Lea Bridge Gas Company have succeeded in carrying their Bill before a Committee of the House of Commons, with but slight and unimportant modifications. The standard price was reduced by the Committee from 5s. 6d. to 5s. per thousand, with the usual standard rates of dividend on old and new capital. We are sorry to find that some of the opponents of the Company, notwithstanding the advantage they have gained, have resolved on carrying their opposition to the House of Lords. We do not believe they will take anything by their motion, and regret to see the money of the ratepayers of Leyton wasted in fruitless proceedings. It is impossible that gas in a district such as is supplied by the Lea Bridge Company, could be furnished at a very low rate; but the great incentive to a cheap supply would, of course, be the operation of the sliding scale. It is absurd to argue, as, we regret to say, some people in that neighbourhood do, that the standard price, being fixed at 5s., gas will never be lower; nor is it fair to institute comparisons between the circumstances of the West Ham and Lea Bridge Companies. The former have a comparatively densely populated district, while the latter have extensive limits, which are being but slowly built over. These facts ought to make the Local Boards who oppose the Company content with their partial triumph. We have the minutes of evidence taken before the Committee, the publication of which we hope to commence next week.

A deputation from the Hastings Gas Consumers Committee have waited upon the Directors of the Hastings Gas Company,

to urge upon them the desirability of reducing the price of gas. We shall not dispute the fact that gas at Hastings is somewhat dear; but how, under present circumstances, the Company can make it cheaper, we do not exactly see. No doubt, if the Company would cease from the practice of paying back dividends, a little might be done for the consumers. Still, however, the arguments put forward by the deputation on this point are perfectly fallacious. They ignored the fact that the law gives the Company the right to make up back dividends—a right which no member of the deputation, in his own individual capacity, would neglect to exercise. The plea that many of the shares have changed hands, goes for nothing, for every purchaser paid for, and took, the shares with all their attendant risks and advantages, among the latter being the prospect that, at some time or other, the Company might be able to make good arrears. It is very difficult to institute a completely satisfactory comparison between the circumstances of any two Companies, so varied are the elements to be taken into consideration. Most certainly it is not fair to compare the Hastings with the Brighton Companies. It would take too much of our space to show why gas at Brighton ought naturally to be cheaper than gas at Hastings; still we may express a hope that the Hastings Directors may soon see their way to reduce the price. The duty on coals paid at Hastings goes, of course, to the advantage of the ratepayers, and so far is equivalent to a reduction in the price of gas. If this impost, which exists in but few towns in England, were abolished, Hastings might at once have cheaper gas; but then it might be argued that the gas consumers would be benefited at the expense of the general ratepayers. The Directors have not, as yet, given any decided answer to the deputation, whom they very courteously received.

The Gas Committee of the Corporation of Bradford have just received what may be termed a windfall. It seems that the old Bradford Gas Company, seven years ago, contracted to dispose of the whole of their ammoniacal liquor for £800 a year. That contract is just about to expire, and the Corporation, to whom the gas-works were soon after transferred, having advertised for tenders, have received one offering them £10,600 a year. Of course, the quantity of liquor produced now is considerably in excess of that made in the Company's time; still the disparity in price is very remarkable, for seven years ago liquor was beginning to rise in value. It may be mentioned that the contractor, who has hitherto paid £800 a year, has recently offered the Corporation £8000 a year; so we need not hypocritically express a hope that his business for the past seven years has been a very profitable one. It is gratifying to find that Corporations and Gas Companies alike become more and more alive to the value of residuals, which, in our opinion, will continue to increase. It is amusing to read in a Bradford paper that the increased value of ammoniacal liquor is to be ascribed to its utilization in the production of aniline colours.

The Corporation of Wigan have had a small fine inflicted upon them for not filing their gas accounts, in acquiescence to statutory requirements; they will now be wiser, and for the future will doubtless conform to the law.

The Chief Gas Examiner for the Metropolis, an abstract of whose report will be found in another column, is again able to state that the Companies under his supervision have, during the past quarter, strictly complied with the requirements of the law. We have said Companies, but, as a matter of fact, the testing-stations of the Commercial Company have been closed for the quarter, and we have no returns relating to them. In our simplicity, we entertain an idea that a week would be quite sufficient in which to put a testing-station in order. There are those among the members of our Local Authorities who consider gas-testing a farce. We do not agree with them, but we can easily imagine that the spectacle of a Gas Examiner with nothing to do for three months must annoy the economists.

The water schemes of the Metropolitan Board have received their *quietus* at the hands of the Government. The Water Purchase and Supply Bills having been lost, there is no knowing to what that restless, meddling body may now turn their attention, and we should not be surprised to find that next session they made another assault on the Gas Companies. It may be that the Government will propose to deal with the Gas and Water Questions together, but at the moment we write we have no information as to their intentions.

On Saturday evening an experiment was made with Mr. Lane Fox's invention for simultaneously lighting and extinguishing gas-lamps by means of electricity. This invention has been fully described in our columns. In this instance we were informed that fifty-five lamps in Waterloo Place and Pall Mall West were placed in circuit, a number a little in excess of those experimented with at the Fulham works of the Chartered Gas Company. Out of the fifty-five, about ten, we believe, proved obstinate—some would not light, and some, when lighted, refused to be put out. It must be understood that we do not quote this experiment as either a failure or a success. It was neither one nor the other. We have little doubt that Mr. Lane Fox will, after some—it may be long—perseverance, perfectly succeed in what he desires to accomplish; and the only thing that remains to be considered is the *cui bono*. The first thing the invention proposes to effect is the saving of gas. This will really be small; for as the lamplighter goes his rounds he turns on the tap of each individual lamp, and lights it, and no gas is lost. The next saving proposed is the suppression of the lamp-lighter; but as the lamp-cleaner must inevitably be retained, and the two men are really one, we do not see exactly how any direct saving can be made in this direction. Still, it may be admitted that, under some circumstances, and especially when gas is supplied by Corporations, or under the average meter system, some advantages may be gained when the invention is perfected. At the present moment, we do not see what may be gained by Gas Companies who supply under the ordinary contract system. We are unwilling, however, to offer the smallest discouragement to any really scientific invention, and we regard this of Mr. Lane Fox's as one of much excellence. We were informed that the electric power which he uses at present is capable of lighting and extinguishing three hundred lamps; and a battery being placed in a convenient position, the current may be sent in different directions, so as to operate upon an equal number of lamps in several districts.

Water and Sanitary Notes.

The Metropolitan Water Companies are naturally very anxious to ascertain the intention of the Government as to the second reading of the Purchase Bill promoted by the Metropolitan Board of Works, and for this reason they obtained another interview with the Home Secretary on Thursday last. Their specific object was to elicit from the right honourable gentleman, if possible, what answer he would give to the question which Mr. Fawcett, M.P., put to him last night. The question was as follows:—"Whether he would consent to the appointment of a "Select Committee to inquire whether the Water Supply of "London should continue to be in the hands of private Com-"panies; and, if not, to what public body it should be entrusted, "and on what terms the rights of the existing private Companies "should be acquired?" The Companies appeared to think that Mr. Fawcett's object was to secure a second reading of the Bill without discussion, in order that it might be referred, in the usual way, to a Select Committee upstairs. This, however, may not have been the object of the honourable Member for Hackney, whose wish was, perhaps, to obtain a Committee with wider powers of recommendation than ordinary Select Committees obtain. The Home Secretary, however, declined to give a direct answer, but promised, after consultation with his colleagues, the President of the Local Government Board and the Chancellor of the Exchequer, to be prepared with a reply to Mr. Fawcett. Last night the question was answered, in the absence of the Home Secretary, by Mr. Sclater-Booth, and the reply was, for us, sufficiently explicit. The Government do not see any necessity for the appointment of a Committee to consider matters which have already been reported upon over and over again. Further than this, they express their readiness to deal with the whole question when it becomes ripe for legislation. *Sic transeunt* some thousands of pounds of the ratepayers money wasted by the Metropolitan Board of Works. We hope this august body will be as satisfied with Mr. Sclater-Booth's reply as we are, and as the ratepayers at large have good reason to be.

We understand that the arbitrators in the matter of the Stockton and Middlesbrough Water-Works purchase have made their award, and a few days ago the joint Boards gave a cheque for £5300, and took it up. The terms settled have not yet been made known, but we shall learn them in a few days. Whatever they may be, however, we may take it for granted that the joint Boards will have no reason to congratulate themselves on having acquired a bargain. They will pay dearly for the honour of being the first to make a really compulsory purchase of a Water Company.

The Richmond (Surrey) Water-Works are not yet completed. The Vestry have already expended £36,000 upon them, and now have applied to the Local Government Board for permission to borrow a further sum of £4000, to carry out works which it is estimated will cost £3974. This is sailing very near the wind. The additional sum, it seems, is not required to improve the sources of supply, although the well is in anything but a satisfactory state, but is wanted to provide for the extension of the

mains into districts which are rapidly being built over. What the quality of water supplied to the inhabitants of Richmond now is we are not informed, but we think we may assume that a great part of it comes indirectly from the Thames, and is not efficiently filtered. Perhaps one of these days the Registrar-General will think it right to include analyses of the water supplied to Richmond in his monthly returns.

Dr. E. J. Mills has discovered that the much vaunted Loch Katrine water supplied to Glasgow requires filtration before it is fit to be used for drinking purposes. According to his annual report, an abstract of which will be published next week, it is more fully charged with organic impurities than is generally supposed. Speaking for ourselves, we excessively dislike it, and are not surprised that Scotchmen are disinclined to drink much without some qualifying admixture. The prospect that the water will have to be filtered on a large scale cannot be pleasing to the Corporation of Glasgow, since it will involve a very considerable outlay. We imagine that domestic filtration is no more common in Glasgow than in London, and among those who drink the largest quantity of water it is never practised at all. We may take it that the danger suggested by Dr. Mills, of typhoid fever being spread over Glasgow, in consequence of a few houses and an hotel emptying their sewage into the river which runs into the lake, is a fanciful one. Dr. Mills's remarks on the effects of the absence of sunlight on the water are of considerable interest.

The Bristol Water-Works Company are, as our readers know, very prosperous. The profits for the past year enable them to pay maximum dividends, and make up some arrears, leaving them a small balance to be carried forward. The Company have now got rid of all opposition, and the Town Council of Bristol, having given up the idea of purchasing the undertaking, the Company have opened before them the happiest of prospects. They are about to issue a considerable amount of new capital, which is required for the expansion of the undertaking. This is likely to be immediately remunerative, so that while the Shareholders benefit, the Bristol public will not suffer. A report of the proceedings at the annual meeting recently held will appear in next week's JOURNAL.

Correspondence.

[We do not hold ourselves responsible for the opinions expressed by Correspondents.]

TESTINGS FOR ILLUMINATING POWER AND THEIR DIFFICULTIES.

SIR,—It afforded me much pleasure to find, in your last issue, my esteemed friend, if he will allow me to call him so, Mr. John Reid, again coming forward with suggestions and matter for the exercise of thought, not only on the part of the younger members of our profession, but also on the part of those who, like himself, have had years of practical experience.

The problem which Mr. Reid desires to be solved is a very difficult one, because all the factors which go to make up the equation are not, as I conceive, really known, and he will, I am sure, pardon me for saying that the statements which he puts forward require to be supplemented by others before any proper conclusion can be deduced.

In the "Remarks on Photometry," which I had the honour of reading before the British Association of Gas Managers in the year 1870, I drew specific attention to the possible errors which might occur in the indications of the jet photometer, as used by the late Mr. George Lowe, and of the durability test, as employed by the late Dr. Fyfe, and after some reasoning on the subject, said, in respect to the latter test:

"The durability test, pure and simple, may not be entirely free from possibility of error, for although the determination of value is dependent on time and volume, or, what is the same thing, on the rate of consumption, yet if flames produced by consumptions of equal *weights* of a combustible become enlarged or reduced as the atmospheric density diminishes or increases, it may be that equal *volumes* of gas will at different atmospheric densities produce flames of equal lenth, and thus lead at times to the under or over estimation of the illuminating power of the gas."

If my reasoning be correct, it follows that every determination of the value of a gas by the jet photometer of Mr. Lowe, or by the jet as used by Dr. Fyfe and his successors, should be accompanied by corrections for barometric pressure, and for temperature, just in the same way as is now done in London, under the Referees Instructions, in the estimation of the illuminating power of gas with the Bunsen photometer.

The information required to supplement the particulars which Mr. Reid has given are, as far as I can see at the moment, to be found in answers to the following questions:—

1. Was the volume of gas produced per ton of coal, or of cannel, in every case reduced by calculation to standard volume at 60° Fahr. and 30 inches barometer?
2. Was the volume operated upon with bromine also so reduced?
3. Were the volumes used with the durability test and with the Bunsen photometer also so reduced?
4. What were the specific gravities of the several samples of gas?

In respect to the first question, I assume, as a matter of course, that the needful corrections were made, because a gentleman of Mr. Reid's experience and capacity is not likely to neglect so important a matter; but in respect to the second and third questions, I feel by no means certain, for as regards the bromine test and durability test, at all events, it has not been customary, as far as my experience in the South goes, to correct for atmospheric conditions. The fourth question may be of little import; but I put it because I am by no means sure that specific gravity may not be an important factor when taken in connection with the condensation and durability tests.

It has, I think, been pretty well established that the photometric value of gas is not so much dependent upon the per centage volume present of hydrocarbons condensable by bromine as upon the character or composition of those hydrocarbons. Hence we may naturally expect to find great apparent discrepancies between the indications afforded by the bromine test and those afforded by the Bunsen photometer. Such discrepancies belong to experiences of a good many years gone by, when Mr. F. J. Evans, in the tables he published, showed that there was but little value to be attached generally to the indications of the bromine test, unless the *density*, as well as the *per centage volume*, of the condensable hydrocarbons were ascertained.

I abstain from any attempt to analyze the results given by Mr. Reid, first, because I have not time just now to spare; and, secondly, and more importantly, I have no desire to anticipate the production of a good paper by some one else on the important subject in question. I cannot, however, help saying that I am gratified to find that the results obtained with the Bunsen photometer are, to say the least, fairly consistent among themselves. This seems to indicate that our old servant, the sperm candle, is not such a bad fellow after all, if properly treated. He may not be very scientific, but, anyhow, he is useful.

F. W. HARTLEY.

55, *Millbank Street, London, S.W., April* 12, 1878.

SIR,—The subject of Mr. Reid's letter, published in your last issue, is one of considerable interest to all gas manufacturers, and it is to be hoped may be thoroughly investigated by the members of the North British Association of Gas Managers.

I have myself given the matter some little attention, in the expectation of being able, at no distant date, to make known the results of my experiments; but, failing just now the requisite leisure for them, I may just suggest to Mr. Reid, and to others who may be interested in the inquiry, that one of the conditions essential for the obtaining of uniform and comparable results, is equality of temperature of condensation.

CHARLES HUNT.

Birmingham, April 12, 1878.

SIR,—The table given by Mr. John Reid, in his letter in your JOURNAL of the 9th inst., is simple and honest, but it appears to me to indicate a defective course of analysis. I am sorry your correspondent has not given the weight of each sample per cubic foot, that being the first step which often inspires confidence, when the bromine and duration tests give conflicting results against the photometer.

I am not astonished at the Gas Engineers in Scotland looking out for something better than bromine and height-of-flame as definite tests; I hope, when they have decided on something better, it will not be a looking-at test. They may obtain results by weight, which will prove how useless these tests are, and prompt them to abandon the enormous waste of unfixed hydrocarbons caused by the use of gas from cannel only. Every practical experimenter must admit that the small volume of gas collected over water in the Cooper's tube, acted upon by bromine, absorbed by potassic hydrate, collected and estimated at the same temperature, is a very doubtful experiment, because the volume in the tube under atmospheric changes alters in composition from equal distillates of coal.

The same applies to the height-of-flame test, and if Mr. John Reid will try the following experiment, it will satisfy him of the uncertain results. Suppose, with the barometer at 30°, and the thermometer at 60°, two U-tubes, 6 inches long, ½-inch bore, and fitted with perforated rubber corks, with ¼-inch glass tubes bent at right angles, fixed tight in each arm, and each weighed filled, the first with granulated calcic chloride, and the second with granulated potassic hydrate. Connect them together in the order mentioned, and measure, per meter, through them a cubic foot of the gas. Re-weigh each tube, and note the *plus* weight. Repeat the experiment when the barometer is at 29°, and thermometer at 70°, also note the weight. Then ask yourself what effect has the water in the gas and in the atmosphere upon the volume of gas in the Cooper's tube, and upon the volume of gas required to give the height of flame, and how such an atmosphere acts upon it. If Mr. Reid will then weigh the other three U-tubes together, three and four with washed dried coke saturated with standard Nordhausen sulphuric acid, and the fifth tube with granulated potassic hydrate, and pass half a cubic foot through the five U-tubes during three-quarters of an hour, he will then have the exact weight of water vapour, carbonic acid, and unfixed hydrocarbons, in grains per cubic foot.

There is not a more useful instrument in the experiment-room than Schilling's specific test for estimating the exact weight of one cubic foot of gas from any sample of coal distilled. This knowledge, acquired as a first step, will inspire confidence in the practical course which I have described.

I can obtain the true value of coal and gas by the volume, and the weight of unfixed hydrocarbons in that volume, at a given temperature, without the aid of the bromine or duration tests. The photometer is the standard; but your readers would be rather amused at the Referees with the weight of hydrocarbons required to give 16 candles, estimated by their newest standard burner, and the weight required to give 16 candles estimated by the old standard. The difference will prove the necessity of the volume and weight test described above.

W. L., P. B.

April 13, 1878.

OFFICIAL METER INSPECTORS.

SIR,—Permit me to call the attention of Gas Engineers, Managers, and Local Authorities to the careless manner in which Official Meter Inspectors frequently carry out their duties. Having constantly to come in contact with them, I find that in one town I can get a meter stamped which I cannot get stamped in another. Surely there is some gross mismanagement in one of those towns, or an excess of duty in the other.

I find by the 12th clause of the "Sales of Gas Act" it is enacted that no meter shall be stamped which shall be found by the Inspector to

register, or be capable of being made, by any contrivance for that purpose, or by increase or by decrease of the water in such meter to register quantities varying from the standard more than 2 per cent. fast and 3 per cent. slow.

Now, my experience in the matter is that many of the Inspectors test wet meters for per centage fast, and never test for per centage slow. Hence we find such meters repaired in a town where there is a Meter Inspector's Office are generally sent to another town to be tested and stamped, giving such repairers or makers an undue advantage over parties wishing to carry out the provisions of the Act.

I wish to know if any of your readers can give the information whether Inspectors failing to carry out the provisions of the Act are not liable to a penalty. "METER."

HYDRAULIC LIFTS FOR PURIFIER COVERS.

SIR,—I observe, in your JOURNAL of the 2nd inst., a letter from Mr. Wyatt, calling attention to the fact that the apparatus now being erected at Beckton is "merely an extension of the same ideas" as those applied to the existing round purifiers, 41 feet 6 inches diameter. This would have been made perfectly clear if the paragraph (which appeared in your issue of the 26th ult.) had explained the difference between the two systems, which amounts to this: The cylinders of round purifiers are supplied, and the covers lifted, with pressure obtained from a *hand-pump*—rather a slow process as compared with the accumulator, combined with the valve and lever arrangement (adopted by Messrs. Abbot and Co., in consultation with Mr. Wyatt), for lifting the 16 new purifiers, 30 feet square. It is also proposed to introduce a simple arrangement to make the covers self-acting, and cut off pressure when lifted to the required height. When the covers are lowered, the water is exhausted back into the tank to be re-used. The accumulator, which is similar to those about to be erected at each end of the pier, by the same firm, for working all the hydraulic cranes for discharging coals, but very much smaller, will have sufficient power to work another set, if necessary.

It is, perhaps, a matter of some surprise that so few Gas Engineers and Managers have hitherto (even on works where the pressure exists) availed themselves of an application so simple and inexpensive as the ordinary hydraulic ram and cylinder, applied either internally or externally. J. COATES.

2, *Suffolk Lane, Cannon Street, April* 8, 1878.

SIR,—I observe a letter in the JOURNAL of the 2nd of April, by Mr. Wyatt, claiming his priority to some one else in the application of hydraulic (hydrostatic) pressure for lifting purifier covers.

You published some years ago a diagram and description of a simple apparatus for this purpose, as designed and adopted by me in 1870. The matter is really not worth contending about, but as it appears to be in dispute, it is perhaps right that no mistake should exist as to the date of my adoption of the hydrostatic pressure lift for purifier covers. I enclose herewith, for reference, a copy of the original printed specification of such apparatus, dated 1870, wherein you will find it minutely described, and it was so carried out by Messrs. Hanna, Donald, and Wilson, of Paisley, for the Edinburgh and Leith Gas Company immediately after.

I shall in no way feel disappointed if it can be satisfactorily shown by Mr. Wyatt, or any other person, that I had been anticipated by any prior application of hydrostatic pressure to the purpose referred to. JOHN REID.

Edinburgh, April 6, 1878.

DEATH OF MR. THOMAS BUSH.—We regret to have to announce the death of this gentleman, which took place yesterday morning at his residence, at Dalston. Mr. Bush was 63 years of age, and at the time of his retirement had been upwards of 40 years in the service of the Chartered Gas Company. For a long period he filled the important office of Accountant to the Company, and by the ability and assiduity he brought to the performance of his duties, commanded the respect and confidence of his Directors. The present Governor of the Company (the Hon. Howe Browne), in proposing a retiring allowance for Mr. Bush, when, in 1873, his health had succumbed to his zealous devotion to duty, spoke of him as one of the most valuable servants that any Company could possess. "He was a man," he said, "of thorough integrity, of great intelligence, and practical knowledge in his department, and one who could be depended upon to the very last figure. He was a man, too, who was constantly at work. So sedulously, indeed, did he apply himself to the labours of his office that he considerably impaired his health, and the extra work put upon him during the time of the late revision completely enfeebled him, so that he was obliged to send in his resignation." A handsome superannuation allowance was cordially voted to Mr. Bush by the Shareholders of the Company, and he retired into private life, carrying with him the sincere esteem of all with whom, during a long and honourable career, he had in any way come in contact. He leaves behind him two sons, both in the service of the Company, whose grief in their present bereavement will find some solace in the many assurances they will receive of the general regard in which their father was held.

QUALITY OF BIRMINGHAM GAS.—Mr. Jackson reports that, during the month of March, at the four gas-making stations of the Corporation, he made 16 examinations of the illuminating power of the gas supplied to the borough. The maximum light in sperm candles was 17·82; minimum, 16·26; average, 17·15. The parliamentary standard is 15 candles, with Sugg's No. 1 "London" burner.

ABERSYCHAN GAS COMPANY.—The annual meeting of the Shareholders of this Company was held on the 28th ult.—Mr. Henry Lewis in the chair. In moving the adoption of the report of the Directors, the Chairman congratulated the Shareholders upon the prosperous condition of the Company, which was most satisfactory, considering the very depressed state of the trade of the district. The success of the Company, he had no hesitation in saying, was mainly due to the exertions of their Secretary and Manager, who had so ably manipulated the affairs of the Company since their formation. It was scarcely necessary for him to state that no advance in the price of gas was made during the period of the coal famine, and since that time a reduction had been effected. The history of the Company seemed to be one round of success, as they were now on the eve of making another reduction in the charge for gas, and he hoped their prosperity would not suffer thereby. The report was adopted, and retiring Directors re-elected. The usual dividends were then paid, and votes of thanks passed to the Directors, the Chairman, and Mr. W. White, the Secretary and Manager.

Parliamentary Intelligence.

HOUSE OF LORDS.

MONDAY, APRIL 8.

The Examiners reported that no further Standing Orders are applicable to the Shrewsbury Gas and Dalton-in-Furness Local Board Bills.

Truro Water Bill,—brought from the Commons, read the first time, and referred to the Examiners.

Torquay Gas Bill,—read a second time, and committed.

TUESDAY, APRIL 9.

The Examiners reported that the further Standing Orders applicable to the East Grinstead Gas and Water Bill have been complied with; and that no further Standing Orders are applicable to the South Hants Water Bill.

Leicester Corporation Bill,—reported, with amendments.

Bradford Water and Improvement Bill, Nottingham Improvement (Gas, &c.) Bill,—brought from the Commons, read the first time, and referred to the Examiners.

Imperial Continental Gas Association Bill,—returned from the Commons, agreed to, with an amendment, which was considered and agreed to.

Durham Water Bill,—read a second time, and committed.

Farnworth and Kearsley Gas Bill,—read the third time, and passed.

THURSDAY, APRIL 11.

The Examiners reported that no further Standing Orders are applicable to the Cockermouth and Workington Water and Nottingham Water Bills.

Tredegar Water and Gas Bill,—brought from the Commons, read the first time, and referred to the Examiners.

Torquay Gas Bill,—reported, without amendment.

Lichfield Gas Bill,—reported, with amendments.

Shrewsbury Gas Bill,—read a second time, and committed.

Petitions against the Bradford Water and Improvement Bill were presented from the Local Boards of Birstal, Clayton, Cleckheaton, Eccleshill, Heaton, Hunsworth, North Bierley, and Windhill, and the Calverley District Water-Works Company.

FRIDAY, APRIL 12.

The Examiners reported that no further Standing Orders are applicable to the Truro Water Bill.

Newry Gas Bill, Marske and Saltburn Gas Bill,—reported, with amendments.

Shrewsbury Gas Bill,—reported, without amendment.

Dalton-in-Furness Local Board Bill, East Grinstead Gas and Water Bill, South Hants Water Bill,—read a second time, and committed.

Leicester Corporation Bill, Torquay Gas Bill, Warrington Water Bill,—read the third time, and passed.

Lea Bridge District Gas Bill, Limerick Corporation Gas Bill, West Houghton Local Board Bill,—brought from the Commons, read the first time, and referred to the Examiners.

A petition against the Nottingham Water Bill was presented from the Corporation of Nottingham.

HOUSE OF COMMONS.

MONDAY, APRIL 8.

The Examiners reported that no Standing Orders not previously inquired into are applicable in the case of the York United Gas Bill (Lords).

Bradford Water and Improvement Bill, Nottingham Improvement (Gas, &c.) Bill,—read the third time, and passed.

Dublin Corporation Water-Works Acts Amendment Bill (Lords),—read the third time, and passed, without amendment.

Imperial Continental Gas Association Bill (Lords),—read the third time, and passed, with an amendment.

Lea Bridge District Gas Bill, Limerick Corporation Gas Bill,—as amended, considered; to be read the third time.

West Houghton Local Board Bill,—as amended, considered; amendments made; to be read the third time.

Public Health Act (1875) Amendment (recommitted) Bill,—considered in Committee of the whole House; Committee report progress; to sit again.

Stoke-upon-Trent Corporation Bill,—reported.

Manchester Corporation Water Bill,—specially reported from the Select Committee, with amendments. [This report will be found in another column.]

A petition against the Hamilton Burgh Bill (the petitioners not praying to be heard) was presented from owners and occupiers of land and houses within the burgh of Hamilton.

TUESDAY, APRIL 9.

The Examiners reported that no Standing Orders not previously inquired into are applicable in the case of the Burton-upon-Trent Commissioners Bill (Lords).

Batley Corporation Water Bill (Lords),—reported, without amendment.

Maryport Improvement Bill,—reported.

Tredegar Water and Gas Bill,—read the third time, and passed.

A petition against the Metropolis Water Supply Bill, and for dispensing with Standing Order 129 in the case of the said petition, was presented from James Stuart Strange.

The petition was withdrawn of Bent Colliery Company, Limited, and others against the Hamilton Burgh Bill.

METROPOLIS WATER-WORKS (PURCHASE) BILL.

The adjourned debate on amendment on second reading of this Bill was further adjourned to Monday, May 6.

Colonel BERESFORD gave notice that he would move to leave out the words printed in italics in the following notice of motion standing in the name of Sir James M'Garel-Hogg:—"After second reading of Metropolis Water-Works (Purchase) Bill, to move—That it be referred, together with the Metropolis Water Supply Bill, to a Select Committee, *four* to be nominated *by the House, and three* by the Committee of Selection. Five to be the quorum."

WEDNESDAY, APRIL 10.

Cardiff Water Bill, Newbury Borough Extension Bill,—as amended, considered; to be read the third time.

The *locus standi* of John Clayton and others against the Bedlington Local Board Water Bill (Lords) was disallowed.

THURSDAY, APRIL 11.

Lea Bridge District Gas Bill, Limerick Corporation Gas Bill, West Houghton Local Board Bill,—read the third time, and passed.

The Examiners reported that the Standing Orders not previously inquired into, and which are applicable thereto, have been complied with in the case of the Castleford and Whitwood Gas, and Sutton-in-Ashfield Gas Bills (Lords).

Hamilton Burgh Bill,—reported.

FRIDAY, APRIL 12.

The Examiners reported that the Standing Orders not previously inquired into have been complied with in the case of the Clitheroe Gas, Water, and Improvement and the Normanton Gas Bills (Lords).

Batley Corporation Water Bill (Lords),—read the third time, and passed.

East Retford Borough Bill, Weston-super-Mare Improvement Commissioners Bill,—reported.

MONDAY, APRIL 15.

METROPOLIS WATER SUPPLY.

Mr. FAWCETT asked the Secretary of State for the Home Department if he would consent to the appointment of a Select Committee to inquire whether the Water Supply of London should continue to be in the hands of private Companies; and, if not, to what public body it should be entrusted, and on what terms the rights of the existing private Companies should be acquired.

Mr. SCLATER-BOOTH: With the permission of the House, I will answer the question put to my right honourable friend the Home Secretary. The existing Metropolitan Water Supply was a subject of careful inquiry by a Select Committee of this House, and there was also a Select Committee which sat last year on the subject of the supply of water to the Metropolis with the view of extinguishing fires in London. The Government, as at present advised, are of opinion that no case has been made out which would justify the appointment of a Select Committee to inquire into the subject to which the honourable gentleman refers. With regard to the second part of the question, whether the Water Supply shall continue to be in the hands of private Companies, there are ample materials at the disposal of the Government to form an opinion when the time arrives for legislation upon it.

HOUSE OF COMMONS COMMITTEES.

MONDAY, APRIL 8.

(*Before Dr.* LYON PLAYFAIR, *Chairman; Mr.* SALT, *Mr.* RODWELL, *Sir* UGHTRED KAY-SHUTTLEWORTH, *Mr.* KNOWLES, *Lord* ESLINGTON, *Mr.* BRASSEY, *Sir* JOHN LUBBOCK, *and Mr.* BRUCE.)

MANCHESTER CORPORATION WATER BILL—REPORT.

The Select Committee to whom the Manchester Corporation Water Bill was referred, and who were instructed—"That they have power to inquire into and report upon the present sufficiency of the water supply of Manchester and its neighbourhood, and of any other sources available for such supply; to consider whether permission should be given to make use of any of the Westmoreland and Cumberland Lakes for the purpose, and, if so, how far, and under what conditions; to consider the prospective requirements of the populations situated between the Lake District and Manchester; to inquire and report whether any, and, if so, what provisions should be made in limitation of proposals for the exclusive use of the water of any of the said lakes"—have considered the matters to them referred, and have agreed to the following report:—

Your Committee on the Manchester Corporation Water Bill have had 19 sittings, and heard counsel in support of the Bill, and also in opposition to its preamble and clauses.

Your Committee proceed to report in the order of the references contained in the instruction.

Manchester is at present bound to supply water to districts beyond the city, and the population within this statutory area of supply is now estimated at nearly a million. When certain reservoirs, now in course of construction, are completed, the present available supply from the Longdendale gathering-ground will not be far from 25 million gallons daily per head of the population within the area.

Your Committee assume that 25 gallons per head form a fair supply for a district, and hence Manchester has at present a sufficient quantity of water for the city, and its statutory area of supply. But the population is rapidly increasing. The houses, within the inner district, supplied with water in detail, increase in number 5300 annually, and in the outer district, supplied in bulk, by 2200. Calculating five people to a house, in ten years more there may be a population of 1,337,000, with a water supply only sufficient for 1,000,000. Considering that a period of ten years is not a very long time to bring a new system of water supply to a large district into efficient operation, your Committee came to the conclusion that Manchester is justified in seeking for additional sources of supply. The question still remained whether it could not obtain this supply in its own vicinity, without going to the Lake District of Cumberland.

All the water which falls as rain upon the hills of the present gathering-ground is not impounded, but the difficulties of a further collection are so great that your Committee were satisfied it would be unwise to calculate upon any large additional supply from the present district. There are many other good gathering-grounds for water in Lancashire, but they are either appropriated by existing towns, or they are so advantageously situated for the natural growth of the population in their neighbourhood, that it would be unjust to a thriving manufacturing county like Lancashire to grant to Manchester the right of carrying away the water from other populous regions for its own use. Your Committee had the advantage of a previous consideration of the general subject of water supply in the report of the Duke of Richmond's Commission, 1868-9, and they draw attention to the following extract, in which they fully agree: "It appears to us that the Legislature should always jealously watch any proposal for a town taking water from a gathering-ground at a distance from it, lest by so doing it may deprive other places nearer to such gathering-ground of their more natural source of supply" (p. 124). Suggestions were made to the Committee, that water might be obtained from the Derwent Valley in Derbyshire, on the other side of the watershed, by driving a long tunnel through the hills; but the costly character of this operation, in support of which only slight evidence was adduced, rendered it unnecessary for the Committee to take it into serious consideration as an alternative scheme.

The opponents of the Bill admitted that, if an important city like Manchester needed a supply of water, and could not obtain it from its own neighbourhood, there was an ample justification for it seeking a supply from the Lake District, although it is 100 miles distant.

This brings your Committee to the next reference in the instruction—viz., to consider whether permission should be granted to the Manchester Corporation to take water from the lakes of Cumberland and Westmoreland. The valleys of the Lake District radiate from Scaw Fell, and are bounded by a series of mountains of slate and primitive rock, from 2000 to 3000 feet in height. The Irish Channel is distant about 15 miles from them, while the south-westerly winds of the Atlantic, laden with moisture, become chilled in mounting over this barrier, and precipitate rain in extraordinary quantity, sometimes amounting to 4 or 5 inches in a few hours. In the hills near Thirlmere the rainfall is about 100 inches annually. As the mountain barriers of this district form the chief natural condensers for the large amount of water which the currents of wind from the Atlantic bring to this island, it is a matter of public interest how far the water thus condensed can be used for the general public benefit. But the public at large have also an inheritance in the beautiful scenery of these mountains and lakes. The abstraction of water for public purposes should, therefore, be made subject to conditions which will confer its use without injuring the natural beauties of the lakes and their surrounding mountains. There are only three lakes—Ullswater, Haweswater, and Thirlmere—at sufficient elevation to supply Manchester by gravitation. The cost of making tunnels from the two first, both from their length and depth below the the surface, renders them less suitable for the purpose. Lake Thirlmere, in Cumberland, possesses great natural beauty, and has a scant population in its vicinity. The hills which supply it with water are, practically, free from mines and other sources of contamination, while the quality of the water is excellent. The Corporation have bought the surrounding hills, so as to preserve the gathering-ground from contamination, either from houses or mines. Their natural state will thus be preserved for future generations. Undoubtedly, Lake Thirlmere possesses many advantages as a source of water supply for a large district, if a portion of the water could be removed without destroying the beauty of a scenery which is a valued possession of the whole nation. Upon this subject much evidence was adduced. The lake is formed by a natural dam of rock at its south end, and this causes the valley to be filled by the drainage from the hills. In former times the lake was much larger than it is at present, but parts of the rocky barrier being worn away, the lake became reduced to its present dimensions. The proposal of the Corporation is to fill up the parts thus abraded by an artificial embankment, and thus to restore the lake to its ancient condition. This is an engineering work of great simplicity, for the highest portion of the embankment will only be 50 feet, and, in proportion to the lofty hills around, it is not of a character to attract attention. The water thus impounded will rise 50 feet, and cover a greater area of ground. It will remove the narrow portion of the lake which is now crossed by bridges in the middle, and will thus certainly obliterate a characteristic feature in it. On the other hand, though one small island will be submerged, two new islands will be formed, so that these may partly compensate for the widening of the narrow part of the lake by breaking up the continuity of the surface. Mr. W. Brodrick Thomas, who has large experience as a landscape gardener, expressed a positive opinion that the enlarged lake would enhance the beauty of the scenery. Undoubtedly, if the roads are constructed as projected in the Bill, the lake will be seen in future by a much larger number of people than at present, for the Proprietors hitherto have kept it very much like a preserve, and have offered few facilities for the enjoyment of the scenery by the general public.

The Corporation of Manchester are limited, by their proposed works, to abstract 50 millions of gallons a day at any future time. For many years this maximum quantity cannot be required. At first only 10 millions of gallons will be taken. With this supply, in a continuous drought of 70 days (a period in that rainy region of exceptional occurrence), the lake would only be lowered 4 feet. With the maximum supply of 50 millions of gallons, a period of 70 days drought would lower the lake 20 feet, and it would require no less than 160 days without rain to reduce the level of the lake to its present condition, even with the maximum abstraction of water. Practically, therefore, the removal of water, even in dry weather, is not likely to exercise any material alteration in the general appearance of the lake. The fluctuation in depth of the existing lake, between high and low water, is between 8 and 9 feet, and such an extent of change is not likely to occur under the new conditions, unless under exceptional droughts of continued severity. As the margin of the lake consists of shingle and not of mud, the temporary alterations in the level will be unimportant.

Your Committee, satisfied that the water of Lake Thirlmere could be used without detriment to the public enjoyment of the Lake District, proceeded to examine the means for carrying the water to Manchester. This is to be effected by a composite aqueduct of 102 miles in length, partly consisting of 14 miles of tunnels, partly of 39 miles of a "cut and cover" channel in the ground, and partly, in the case of valleys and rivers, by 33 miles of cast-iron syphon pipes, or, in a few cases, by bridges. Your Committee, before passing the preamble, took ample precautions, not only that the landowners in the Lake District, but also that the general public, should be protected from the works being executed in such a manner as might deface the natural beauty of the scenery, for the clauses now introduced give both the landowners and the public the right to lay complaints before Her Majesty's First Commissioner of Public Works. Your Committee, having carefully provided for these interests, are satisfied that, beyond the temporary inconvenience and unsightliness caused by the construction of the works, there will be little or no permanent injury to the scenery. The tunnels, which are 7 feet in diameter, are likely to be the chief and longest source of inconvenience, but evidence was given that the modern use of machinery for driving tunnels, instead of hand labour, will much shorten the time for their construction as compared with former works of this kind.

Your Committee were further instructed to consider how far the prospective requirements of the populations situated between the Lake Districts and Manchester should be consulted before authority was given to the Corporation to supply itself with water from Lake Thirlmere. Various important towns and rural districts, including Walton-le-Dale, Wigan, Hindley, Leigh, Oldham, and Hyde, actually applied to be supplied with water from the Manchester Corporation in the event of this scheme being carried out. The Duke of Richmond's Commission had already recommended, in their general report on water supply, "That when any town or district is supplied by a line or conduit from a distance, provision ought to be made for the supply of all places along such line."

Considering, however, that Manchester supplies the capital and executes the proposed works, your Committee deemed that its district of supply had a prior right to 25 gallons of water per head of the population, as it increases, from all its sources of supply. Subject to this prior use, your Committee introduced a clause giving to Corporations, Urban and Rural Sanitary Authorities, throughout the line of conduits, and in their neighbourhood, a right to require a supply not exceeding 25 gallons per head of the population then existing, if the Local Government Board deemed their demand to be reasonable. The cost of supply might be made a matter of agreement; but, if no agreement were made, then the cost was to be at the rate of 4½ per cent. on the proportion of the capital expended to produce the supply demanded, and a like proportion of an annual sum of £20,000 to enable the works to be maintained and managed. Practically, these two sums, added together, do not differ widely from the basis of a 5 per cent. charge on the whole capital when the works are completed for a full supply.

Your Committee having carefully inquired into the premises in accordance with their instructions, now present this as their Special Report.

The Select Committee further report, that a report from the Local Government Board has been laid before the Committee, and considered by them, and that they have adopted such of the recommendations therein contained as appeared to them applicable to the circumstances of the case submitted to them. That with respect to Standing Orders Nos. 185 and 186, the compulsory powers of the Bill extend over more than

15 houses occupied by persons belonging to the labouring classes, and the Committee have inserted a clause in the Bill requiring the promoters to procure sufficient accommodation for such persons before exercising the said powers. And that they have examined the allegations contained in the preamble of the Bill, and amended the same by inserting a recital as to the supply of water in bulk by the Corporation to certain Local Authorities, and found the same, as amended, to be true; and have gone through the Bill, and made amendments thereunto.

THURSDAY, MARCH 7.

Before Sir LAWRENCE PALK, *Chairman; the Marquis of* LORNE, *Mr.* STARKEY, *and Mr.* ERNEST NOEL; *Sir* JOHN DUCKWORTH, *Referee.*)

CHELTENHAM WATER BILL.
CHELTENHAM CORPORATION WATER BILL.

(*Continued from p.* 555.)

[Sir Lawrence Palk being absent, from indisposition, the Marquis of Lorne took the chair during the remainder of the inquiry.]

Mr. *Thomas Hawksley*, C.E., examined by Mr. VENABLES.

I have paid particular attention to the case of the water supply of Cheltenham. In 1845, I was engaged on the sand-bed question. A considerable portion of the town is placed on a sand-bed, which is charged with water, and for many years the opinion of the town—though, of course, a perfectly erroneous one—was that this was the most precious of all kinds of water. I thought at that time that the sand-bed afforded a very indifferent supply, and must necessarily go ultimately out of use. Cheltenham is placed upon the lias, which is of waterless formation; the lias is in places scooped out, and those places have been filled up with sand in basins. That sand contains a certain quantity of water, derived chiefly from rainfall, but partly by percolation from the neighbouring streams. Where the clay comes to the surface there is practically no water. There are no springs in the neighbourhood of any magnitude that are not taken up. There are small springs on the line of the river Chelt, but they are perfectly insignificant for the purposes of a town supply. The Company have, in fact, picked out for their own supply all the useful and available springs. There are two very beautiful springs on the Cotswolds, which would be perfectly available for the supply of Cheltenham if they could be obtained, but they cannot be. Every effort made to obtain them by means of works or by means of money has failed. The opposition of the estate owners for miles is so determined, and so powerful, that it is impossible to overcome it. Besides, these springs are the two heads of the Thames, and Parliament have a distinct objection to the sources of the Thames being tapped for the supply of any place within the watershed of the Severn. Not being able to obtain these springs, I some years ago traversed the whole line of escarpment and the watershed, for the purpose of discovering available sources, and I was not then able to discover any. The sources of the Chelt would, of course, receive the first attention, but the quality of the springs would be the same as that of the present supply, while the surface drainage would be very inferior. The gathering-ground there is very unsuitable. It, to a considerable extent, consists of lias clay, and I never knew a good water produced from the lias. Where the lias does not come to the surface, which it does over a considerable part of the valley, there is the oolite, and these springs come from the rainfall of the oolite. The smallness of their volume is partly to be accounted for by the fact that the strata over a considerable part of the surface declines towards the Thames Valley, and it is only when the strata are loaded with water that the water oozes over on the higher level, and forms the more copious part of the springs, which descend into the Chelt Valley. The supply to be obtained from the springs and the sources of the Chelt would go down in summer to less than 100,000 gallons a day. Although this has been a wet winter, the spring at the head of the Chelt was the other day yielding only about 30 gallons a minute, or 40,000 to 50,000 gallons a day—a perfectly insignificant quantity. The Corporation propose by their Bill to send 100,000 gallons as a minimum down the Chelt every day. That would, of course, have to be provided before any water could be taken for supply. I could never have proposed a scheme in a valley like that without proposing the usual *quantum* of compensation—viz., one-third. It is not the same thing to give compensation in money and compensation in water; in some places money will satisfy the interests, and in others it will not. I never could make out that we should get so much by the utilization of the whole valley as something between 300,000 and 400,000 gallons a day, which is, when we are coming to Parliament for a competent scheme, an insignificant *quantum*, even when added to what we have got. The whole quantity, deducting water for compensation, would be about 600,000 gallons a day. Taking the population at 60,000, that would give ten gallons per head per diem. This allows nothing for future increase or extension of limits. I should object altogether to supplement the spring water by water from the drainage area in the neighbourhood; but I am not, in that calculation, estimating the capability of the springs only. I am taking the whole drainage area, combined with such storeage as the valley affords. Taken by itself, the drainage area would give more water, upon an average of three ordinary dry years, than the quantity I have mentioned; but there is no place to put it in. You cannot calculate altogether from that drainage area on more than about 7½ inches of rainfall, of which only a very small part can be collected, because the valley does not afford good situations for competent reservoirs. In that neighbourhood it is absolutely necessary to provide a storeage for 250 days. At Leicester, where the rainfall was exactly the same in 1868, 244 days supply was taken from the reservoir before it began to refill. What has to be done is this: The contents of the reservoir must be divided by 250 days, and taking the contents of a reservoir, such as could be made on the Chelt at 100 million gallons—that divided by 250 would give 400,000 gallons a day—out of which compensation must be given. The Leicester reservoir, holding 340 million gallons, was emptied in 240 days. About 300,000 gallons a day is all you could rely on for town supply from the gathering-ground of the Chelt Valley. One objection to this gathering-ground is that it is grass land for the most part, and is necessarily manured to a considerable extent with town manure, which is not a desirable thing. The locality is not favourable, as affording sites for reservoirs. The ground is traversed by a high road, which runs through nearly the middle of the valley from Cheltenham to Oxford, and by a railway now in course of construction, so that it has become necessary to form what can be made of a reservoir by putting an embankment across the stream, and then running it for a great distance on the side of the road. As a matter of course, a reservoir formed in that way not only holds very little water, but is also disproportionately expensive; and, being upon unsafe ground, is necessarily dangerous to the town which is situated immediately below it.

Mr. BIDDER objected to this evidence, as no such point was raised in the Company's petition.

The CHAIRMAN said they might go generally into the matter of the possibility of getting a sufficient supply in the neighbourhood, without going into the details of the scheme.

Witness: The result of twelve years consideration was that I could not recommend the Chelt Valley to the Company. It was not a proper place to resort to, and I advised the adoption of the River Severn. The Directors agreed with me, and the result is, so far as the Company are concerned, the project now submitted to the consideration of the Committee. I was concerned in the various parliamentary proceedings which took place with a view of introducing the Severn water. The opposition in those cases was principally directed to the quality of the water. The result was that while, for the time being, it induced the Company to abandon the Severn for the supply of Cheltenham, they adopted it for the supply of Tewkesbury; and having been able to demonstrate, by means of that supply, the excellent quality of the Severn water, they are now before Parliament under different circumstances to what they were at that time. They were then poor, but are now rich.

Mr. BAZALGETTE: As a matter of fact, did the Referees in 1865, having the Severn water specially submitted to their consideration, report "The Referees are of opinion that there are no sufficient objections to the proposed source of supply and the quality of the water"?

Witness: They did; and the preamble of the Bill was passed by the House of Commons. The result of that inquiry was to introduce the Severn supply to the town of Tewkesbury.

Mr. BAZALGETTE: I presume I may take it, before you advised the introduction of the Severn water, you satisfied yourself as to its quality?

Witness: I did. I had known the Severn for many years previously; I have been engaged upon engineering matters connected with that river from about the year 1844. I have here samples of the ordinary water supplied to Tewkesbury. It is a very excellent water, suitable for the supply of any large community. It is good for all purposes. It is a clear, bright, wholesome, and palatable water, good for domestic, for manufacturing, and for general purposes. The same water practically is supplied to Worcester; but it is somewhat improved in our case by the introduction of the Teme. The Teme drains more than 700 square miles—a very beautiful drainage-ground. I am intimately acquainted with the Teme. Any sewage passing from Worcester would get the full benefit at once of the influx of the Teme. We are dealing with an enormous river; we have 2700 square miles of drainage coming down to the works at Tewkesbury, and the population is so sparse that there are three acres of land to every individual. I admit it is not a desirable thing to have sewage introduced into any stream; nor will it be introduced for long, for the Rivers Pollution Act, which only came into operation a few months ago, contains provisions very easy to put in force, which will have the effect of making the towns either keep their sewage out of the river or purify it before it is put into it. At the same time, allow me to mention that the introduction of that small quantity of sewage into so large a volume of water, charged with oxygen as all these waters are, cannot by possibility continue to be sewage, even for a couple of miles. It is all burned out by the oxygen in the water, and utterly destroyed. The constituents of all the foulest things on earth are as pure when separated as in their normal condition; it is only the association, and the relative proportions in which they are associated, that give them a particular form, but the moment they are dissociated they are as pure as ever they were.

The whole volume of the river is charged with air, in fact?—There is air, undoubtedly; but the sewage is in three times the quantity in which it exists in atmospheric air. The whole Atlantic would be one foul cesspool at the present moment if it were not for this spontaneous purifying power of our rivers.

Apart from the question of quality, is the Severn water capable of easy filtration?—It is remarkably easy to filter.

Having regard to the geology of the Severn watershed, is it favourable for obtaining good and untainted water?—Very so; a large portion of it consists of the silurian formation, and other parts chiefly of the new red sandstone. The river at Tewkesbury is not often affected by tidal water and it has never been found necessary to suspend pumping, though it would be easy to do so if the necessity arose. The fact is, the Severn is practically pure, whatever it may be sentimentally. What the Company propose to do, by their Bill, is to utilize all the existing works as they now stand, by means of the water which they will obtain in addition from the Severn. We propose to make our works in two sections; to commence by putting down engine power and filter-beds, and pipes for the raising and conveyance to Cheltenham of 1¼ million gallons per diem, making our present resources 1½ millions per diem—that is, for the present population. Then, for a future population, in years to come, we propose to make the second half of the works for another 1½ millions, making 2½ millions out of the 3 millions, and leaving the remainder for Tewkesbury and other places in its neighbourhood. Our object, then, is to supply, on the line of the pipe which follows the public turnpike road from Tewkesbury to Cheltenham, all the villages upon the lias. Gloucester, also, is not well furnished with water at the present time, and will probably be very glad to take a supply in bulk. There will be no additional works at Hewletts, but there will be the necessary additional reservoir accommodation at Tewkesbury. The 1¼ million gallons proposed to be taken at once will supply 25 gallons daily to each person, taking the population at 60,000; 20 gallons would be amply sufficient, but we provide 25. It is not a manufacturing town, and does not want large quantities of water. The usual seven or eight gallons for manufacturing purposes out of the 25 gallons are not required. The total cost of the works for supplying the 3 million gallons will be £112,000; but, being made in sections, the first outlay will be about £60,000, including the land for the whole. The scheme is simple, economical, and efficient, and I am prepared, if necessary, to give reasons for that opinion.

Cross-examined by Mr. BIDDER: The Company consulted me some time last autumn as to the best policy, with a view of meeting the Corporation Bill.

Mr. BIDDER: Did not you advise them that they had better get up a scheme of their own, or else they would not have a leg to stand on?

Witness: No.

Or to that effect?—Well, I may say to that effect, because, of course, they would not.

And did you not advise them, if they were to have any chance of opposing the Corporation Bill, they must get up some scheme of their own, and bring it to Parliament?—Certainly; that would be a natural part of the business; but I did not advise them to go to the Chelt. There was ample time to deposit plans. We did not avail ourselves of the old survey of 1865; every inch of the ground was surveyed again, and there is no part of the scheme the same as that of 1865. I should prefer spring water to river water, as being brisker and more palatable, if it could be got.

Is is not the fact that there is a very general movement throughout the country, on the part of towns deriving their water supply from rivers, to leave the rivers and go to springs or subterranean sources of supply?—I cannot say there is. It is so in manufacturing districts. If you were to take the ideal and sentimental view of the case, which is taken by some professional chemists, then not 2 per cent. of the waters of any county would be available for the supply of the population.

You do not take the sentimental view?—No; I take the practical view. A hundred water-works cases of my own have taught me the nonsense of all that. The extreme dry weather flow of the Severn may be 90 million gallons per day. The Worcester sewage is about three-quarters of a million gallons a day.

If the sewage of Worcester is fairly mixed, the consumers of your water

will have 25,000 gallons of Worcester sewage every day?—Taking your mode of putting it, that would be the fact; but assuming my way of putting it—that it is not to be consumed—it would not be the fact.

It is there, but it is transformed in its character?—It is not transformed, it simply does not exist; but you know the worst of the sewage will be taken out, and so will the sewage of all these places.

I know your views, they are very peculiar views.—Peculiar?

I think I may summarize them thus—that you may take any sewage and mix it in a river in the proportion of something like 1 to 40 or 50, and if you only let it run down the river 20 miles you may drink as much of it as you like?—You may assume that, if by sewage you mean ordinary decomposed sewage.

Ordinary house sewage?—Undoubtedly.

Containing fœcal matter, and so on?—You like to put it in an obnoxious way. That is the most decomposable of all effete matters. Although Cheltenham, as an inland watering-place, is of necessity dependent on the purity of its water, I do not think its reputation would be injured by the introduction of the Severn water, because it would be impossible for any one to know the difference. I am still of opinion that Sierford Spring is the best source of supply for Cheltenham, and that it ought to be brought to Cheltenham; but that, in view of the decision of Parliament, is out of the question. I may have said before the Committee, upon the proposed acquisition of the Sierford Spring, that the Severn water was not fit for domestic purposes, even if it could be got.

Then what has happened since to make it so?—The making of the weirs. The tide at that time ran up to Worcester, and the water washed backwards and forwards past Tewkesbury. The Avon water, which flowed into the Severn some eight or nine miles above Cheltenham was not a good water in 1854. Since then sewage works have been made at Coventry, Rugby, Leamington, and Warwick. But, apart from that, the Avon water is not a good water. It does not come off a good formation for water supply purposes. It is very hard water. The size of the main is 14 inches for each section. I do not know that soft water is better than hard water on sanitary grounds. As a matter of fact the hard water towns have about 14 per cent. less mortality than the soft water towns; but I am not disposed to attribute that entirely to the quality of the water. The different occupations of the people may in part account for it.

Dr. *Charles Meymott Tidy*, examined by Mr. MICHAEL.

I am a Batchelor of Medicine and Master in Surgery. I am Professor of Chemistry and Medical Jurisprudence in the London Hospital. I have had large experience in all matters connected with public health, and the supply of water to large communities. I have carefully examined the River Severn. The banks are exceedingly clean, with no black deposit, and there is nothing whatever to denote contamination by sewage. I have twice examined the course of the river between Worcester and Tewkesbury. The water at Tewkesbury is undoubtedly excellent. I took a series of samples at different spots. The general result was that, after a certain spot, about a mile below the junction of the Teme with the Severn, the water became very good. After the Worcester sewage flows in, the total solids, the chlorine, the organic carbon, and the nitrates increase, clearly due to the contamination of the sewage; but the water rapidly becomes purer and purer. There is a slight variableness in the quality, which I account for by the existence of bottom springs. At Tewkesbury there was only ·02 of a grain of ammonia per gallon, and 1·656 grains of chlorine. The hardness at the intake was 11° before boiling, and 6° after boiling. It is a moderately hard water, and excellent for general use. The organic carbon was ·212 in 100,000 parts, and the organic nitrogen 0·018. Though the river receives some sewage at Worcester, it becomes oxidized by the time it reaches Tewkesbury, and is practically destroyed. I have given a very great deal of attention to the medical aspects of water supply, and as a medical man I say the water supplied from the river at Tewkesbury is a perfectly wholesome, pure water, and not the slightest danger need be expected from drinking it.

Cross-examined by Mr. POPE: I gave evidence in the Stockton case, in favour of the Tees water. I do not believe in sewage after it has flowed 18 miles.

Mr. POPE: But you have found it very difficult to persuade people, notwithstanding all the authority of chemists, that water is as good which has had sewage in it as water which has not?

Witness: A sentimental argument is always more difficult to meet than a truly chemical one.

Assuming that doctors of authority differ, how are the unfortunate individuals who have to drink the water to make up their minds?—Though the Rivers Pollution Commissioners would say that the water contains too much carbon, I beg to say that, besides the chemical aspect of the question there is the medical aspect, and, in my opinion, the report of the Commissioners was erroneous, looking at the subject from a medical point of view.

Apart altogether from medicine or chemistry, supposing there is a source of supply, open to a community, which is free from any such objection, should you be surprised at the sentimental feeling of the community that they would rather have it than sewage water?—But I do not admit this to be sewage water.

Water which contains double the quantity of organic carbon?—I do not think it makes the slightest difference in the world.

The comfort of the drinker would depend upon his faith in the water?—No. I would say the comfort of the drinker would greatly depend on experience.

Cross-examination continued: I never saw a disease germ in my life. When we hear so much about them I think it is only fair to ask that those who assert their existence so strongly as the actual cause of disease, and the means by which disease is spread, should at least give us some evidence of their existence. I am rather pained to hear people speak so positively as they do about things which they have never seen. I quite admit that water impregnated with sewage matter could produce disease. You say it is due to a germ; but it is perfectly clear that water that has had sewage in it is drunk by a large number of people without producing disease. My samples which gave the analysis I have mentioned were taken during the winter flow, on the 11th of January. It is not necessarily the case that during the summer, when the volume of water is less, whatever impurity there is would exist in larger proportion. It may be so, but I have never made an examination of the river in summer. You would expect it to be so, but you do not always get it. I do not know that the sewage of Worcester decreases during the summer; but whether it is the dry flow or the average flow, the dilution and oxidation are sufficient. I do not agree with the Rivers Pollution Commissioners when they say that there is no river in the United Kingdom long enough to effect the destruction of sewage by oxidation. As the result of an immense number of experiments, I really know that sewage does become oxidized. There is not a single fact in support of a possible danger arising from sewage after a long run. I am convinced that not a particle of organic matter that goes into the Severn at Worcester finds its way down to Tewkesbury.

Mr. POPE: Notwithstanding the strength of the opinion which you have consistently expressed, Parliament preferred to give Stockton a pure supply of water.

Witness: I cannot say in the least what was the reason that operated on the Committee to take the view they did. They did not say it depended on the chemical evidence, and therefore you can scarcely assert that the reason Parliament took that view in that case was due to the fact of sewage going into the water.

Re-examined by Mr. BAZALGETTE: At the intake, the water of the Severn is not simply good, it is excellent. The question is not what goes into the river at Worcester, it is what is the character of the water at Tewkesbury, and I give a positive opinion that it is as good and wholesome a drinking water from a chemical and medical point of view as it is possible to have. Neither I nor any other man has ever caught a disease germ. It cannot be detected by either microscopic or chemical analysis. I do not say there may not be some truth in the germ theory, but it is not even an hypothesis; it is simply an effort of the imagination. I did not hear the evidence as to the diminution in the number of cases of typhoid fever in Tewkesbury since the introduction of the Severn water, but I can quite believe it. Even if the rainfall were used, there would be some organic matter in it. The magnificent brilliancy of the water in the pure-water tank at Tewkesbury almost surpassed anything in the way of water I had ever before seen. The clearness which enables one to see from the top to the bottom is wonderful. Rainfall flowing into a stream would undoubtedly contain a certain amount of organic carbon. To my mind, a flood does not in any sense improve a river. Such a large quantity of water displaces a great deal of solid matter, but not to a sufficient extent to make the water dangerous. Of course, that would apply to small streams as well as to rivers.

Mr. BAZALGETTE: Take ordinary vegetation, which at certain seasons of the year undergoes decomposition, would that produce organic carbon?

Witness: Everything that contains carbon supplies carbon.

The presence of organic carbon, in a small quantity, does not necessarily denote the presence of sewage in the water?—Oh dear, no. The fact is, if you were to put a teaspoonful of turtle soup into a large reservoir, and were to test the water solely by the existence of organic carbon, you would return a report to the effect that that water was unfit to drink.

Mr. *William Crookes*, examined by Mr. BAZALGETTE.

I am a Fellow of the Royal Society, and Vice-President of the Chemical Society. I accompanied Dr. Tidy on the second occasion, when he went to take samples of this water on the 2nd of March, but not on the 11th of Jan. The results show that the water at the intake above Worcester, before the sewage falls into the river, is excellent. A little below the outfall of the Worcester sewage there is a sudden rise of constituents, which shows the presence of sewage matter. Below where the River Teme falls in there is a sudden drop in all the constituents—in the hardness, in the amount of chlorine, and in the total solids. I consider that that sudden drop is caused by the water of the Teme not having quite mixed with the water of the Severn. The water soon regains its normal quality. At one point there is a small influx of saline matters, which cannot be accounted for except by the existence of some bottom spring. This is a thing not at all unknown in that formation. It is well known that in the new red sandstone there are saline springs containing a large quantity of common salt. At the intake at Tewkesbury the organic nitrogen is very small, and the initial hardness about the same as the regular run of rivers. It is a tolerably soft water. The initial hardness of it is between 10° and 11°, and after boiling 2·3°. The amount of chlorine is not more than one would ordinarily expect in a river. There are 2·44 grains of salt in an imperial gallon; but in well water as much as 30 to 40 grains are frequently found. A great many rivers contain much more chlorine. It depends upon the formation they pass through. The amount of chlorine found there is no indication of the presence of sewage. The same cause which increases the amount of chlorine in the bottom spring also increases the amount of total solids, but they do not rise above 21·75 grains per gallon. The free and saline ammonia are nothing in this pure water. The nitrates and nitrites represent nitrogen reduced to an innocuous form. The water is most excellent in a sanitary point of view.

Cross-examined by Mr. POPE: The nitrates and nitrites are produced by the oxidation of nitrogenous matters. They might be the result of animal contamination. Probably that is so. I consider the amount of chlorine present is a much better test of previous sewage contamination. My analysis does not give the organic carbon, as the time required to carry out a proper analysis of the organic carbon was greater than has been allowed since the 2nd of March. On that date the river was in flood about 18 inches above the normal level, but it was not overflowing its banks.

Mr. POPE: Do you believe in disease germs?

Witness: I cannot say that I do. I like to have good evidence on a subject before I believe it.

But you know one is in the habit of looking to you as a great authority on things that are not seen?—Yes; but I require good evidence, and that I have not had in the case of disease germs. I have tried to form a mental picture of what a disease germ is, and I find great difficulty in doing so. At the same time, I can imagine the almost certain probability of sewage being rapidly oxidized by the oxygen in the water. It is well known that organic matter absorbed in water is rapidly oxidized.

Re-examined by Mr. BAZALGETTE: The experiment upon which Dr. Frankland based his assertion that no river in England is long enough to purify sewage was a laboratory one; but a laboratory experiment in a case like this is of no value whatever. Admitting the existence of disease germs, I do not see why they should be so entirely different from all other organic bodies that they should resist the powerful action of oxygen upon the water. As the water becomes purer the animalculæ die. They are, in a sense, the scavengers of the water, and by emitting oxygen they purify it, and virtually destroy themselves. The oxidation is caused partially by the absorption of the oxygen from the atmosphere, and partly by the oxygen given off by the plants in the water under the influence of light, and those two things are very difficult to imitate in a laboratory. I have tried hundreds of experiments on the oxidation of organic matter, and in all cases oxidation has taken place. Speaking as a practical chemist, I cannot see any fault in the water at the intake, regarded from a sanitary point of view. Water itself may be the product of oxidation of sewage matter. Part would be oxidized into water, part into carbonic acid, and part into nitrates and nitrites, and after the constituents are oxidized they are perfectly harmless.

The CHAIRMAN: Is it a very weedy river? Are there many water plants in it?

Witness: Not very many. The banks are very clean.

Professor *D. T. Ansted*, examined by Mr. BAZALGETTE.

I am a Fellow of the Royal Society, and for the last 30 years have paid a great deal of attention to the question of water supply. In 1864 I was employed in making an investigation into the geological surroundings of Cheltenham, in reference to the quality of the water obtainable from the springs that break out under the escarpment of the oolites. I examined, I think, as many as 80 localities where water broke out occasionally, and I obtained as much evidence as I possibly could with regard to the quantity of water. I came to the conclusion that the total quantity was exceedingly small—not more than about 300,000 or 400,000 gallons per day, taking the average flow of the year. I have examined the country round Cheltenham with reference to the mode in which the rainfall

would make its appearance in springs, and could be collected in the Valley of the Chelt. The rainfall on the hills would be, perhaps, 30 inches; but within the Valley of the Chelt it would certainly be very much less. The rainfall on the hills flows towards the Thames. The rainfall which would make its way to the Chelt Valley, and which could be depended upon, would be too small to supply sufficient water for the town of Cheltenham. The supply obtainable from the springs, and the supply obtainable from the rainfall would not, in my opinion, be together sufficient for Cheltenham. If the springs were all collected, and carried into a reservoir (supposing a reservoir could be constructed that would hold them all) necessarily the supply for agricultural purposes on the hills on the inside of the escarpment would fail, and cultivation would be almost impossible. The land in the neighbourhood of Cheltenham is entirely clay, which depends for its supply of water upon the tributary rills that flow over it. I know the Severn exceedingly well. The whole drainage area of the basin of the Severn is composed on the western side of silurian rocks and altered rocks—for the most part very much altered—of old red sandstone, rocks, which are very hard, and not at all capable of supplying any large quantity of mineral matter to the water that runs off them. The water is not absorbed readily by them. The eastern watersheds are different. They are composed of new red sandstone, and the consequence is that, while the tributaries that come into the Severn from the west are remarkably free from mineral matter, and generally very soft, those that come from the new red sandstone on the east and north-east are invariably loaded with mineral matter obtained from the new red sandstone, a certain quantity of carbonates of lime and magnesia, and aluminous and saline matter. The ground is very mountainous on the western side, while the watersheds on the eastern side are all at a very low level. The Severn water is very soft, so far as all the western tributaries are concerned, and moderately hard so far as the new red sandstone is concerned. Taking it altogether, it makes a water of medium hardness, and is of very good quality in other respects. It is not what I should call a very soft water, but rather inclines to hardness, owing to the new red sandstone. I carefully examined the course of the river between Tewkesbury and Worcester, and I suggested a great many of the points at which the samples were taken. I endeavoured to obtain evidence of what would be the effect upon the water of running over a bed that must, of course, inevitably have received a certain quantity of organic matter from the towns, and the result showed that the water at Tewkesbury was, if anything, a little better than the water above Worcester, though it contained a trifle more saline matter, and also a very small quantity of those mineral matters which necessarily are added to a water when it runs over a bed such as the new red sandstone. The intake is a little below the bridge at Tewkesbury. I heard it stated in evidence that there was an increase in the amount of chlorine at a point between Worcester and the intake—near the intake. It was my suggestion that that might be due to the presence of a bottom salt spring. Undoubtedly there are geological reasons for the existence of such a spring. In the first place, the new red sandstone is never without such springs. The upper members of the new red sandstone are the salt-bearing strata of England and most other countries, and eminently so in that part of England a little to the north. The mineral springs at Cheltenham show very clearly the condition of the rocks there, and the extreme probability of bottom springs existing in various parts of the Severn's course. The Ordnance Survey map also shows that in the neighbourhood of the river thereabouts there are longitudinal faults connected with the lias which covers the new red sandstone, and one of these faults crosses the river pretty nearly in the place where the water suddenly becomes unusually salt. I have seen the water at Hewletts reservoir. It is spring water, and hard. Judging from the analyses, I should say that that water would be decidedly improved if the Severn water was mixed with it. It would be softer.

Mr. Browne (in cross-examination): I think you have confined yourself to geology?

Witness: My work has been connected with the applications of geology.

We know you have been very much interested in water supply, but you have not devoted yourself to chemistry?—Not to chemistry.

How long ago did you make the investigations which are the foundation of your evidence here to-day?—I have known the neighbourhood for a very long time—20 or 30 years, I suppose.

But you have made no examination since 1864?—No special examination.

Did you give evidence before the Committee who sat on this Company's Bill in 1865?—I believe I did.

And you gave similar evidence to what you have given to-day?—I presume so.

And, notwithstanding that, the Company had to continue to supply from the present springs?—I do not know the results.

Mr. Bazalgette: That is entirely wrong, because the Company obtained power to introduce Severn water at Tewkesbury.

(*To be continued.*)

Legal Intelligence.

HIGH COURT OF JUSTICE—CHANCERY DIVISION.

MONDAY, APRIL 1.

(*Before Vice-Chancellor* MALINS.)

HIRST *v.* LONGWOOD GAS COMPANY.

(*Continued from p.* 519.)

Mr. Rigby resumed the argument on behalf of the plaintiffs.

Mr. Higgins: If they will give us clean water from a 1-inch pipe, we will say nothing about the counter claim for costs.

Mr. Rigby: The costs are a very serious question. The course taken by the defendants was such that it was impossible for us to stay proceedings. In their affidavits they call in question all our witnesses have said, and put us to prove, by additional evidence, what they have stated.

The Vice-Chancellor: More than 600 folios of affidavit upon a question whether the defendants were conducting properly their excavation for a gasholder.

Mr. Rigby: Our affidavits showed that from August to December they had been continually pelting us with stones, varying from 28 lbs. downwards, and the last of which we complained particularly was on Dec. 14, 1876. They said it should not take place again, but they had said so over and over again.

The Vice-Chancellor: What case have you after the 14th of December?

Mr. Rigby: We have no case of a stone coming afterwards. But what did take place after the 14th of December was, that, having taken absolutely no precaution to shore up the earth surrounding their excavation, on the night of the 20th an additional slip took place, which reduced our occupation road, which was 20 feet wide up to that time, to 8 feet 6 inches, and our writ was issued on the 21st. If a man is excavating, he is bound to carry on the operation in a way not to injure his neighbours, and if he does, those neighbours have a right to ask the protection of the Court. The plaintiffs did so, and in consequence of the protection so afforded, the excavations have since been carried on in a way we should not have complained of if they had been so conducted from the first.

The Vice-Chancellor: Is this a large Gas Company?

Mr. Rigby: A large Company. The gasholder building is 100 feet in diameter. But, large or small, they ought to have conducted their works so that no injury should accrue to their neighbours. If they had gone on as they were proceeding, we should have lost all our road, and got no access to our mills. Therefore, as regards the commencement of the action, it is impossible to suggest it was not rightly commenced. They bring forward evidence to show that, if the excavations are conducted with due care, no injury will accrue. We say there was not due care, and there is nothing to deprive us of our right to costs. They did not on the 18th of December take precautions, knowing we were about to take proceedings, for they had seen our surveyors and other witnesses, and that we intended to have issued the writ. But we rely on the destruction of the road on the 20th of December; and in the following May it fell in again after they had restored it. The plaintiffs have throughout only been trying to make the defendants do what was proper, and so conduct their works as to cause no injury. The plaintiffs have practically had the advantage of the interim order.

The Vice-Chancellor: They have restored the road now?

Mr. Rigby: Yes, during the progress of the action.

The Vice-Chancellor: How long did it take?

Mr. Higgins: It was commenced before the writ was served, and it took six days to complete it.

Mr. Glasse: And it fell afterwards.

The Vice-Chancellor said he believed that the parties got very angry with each other. They began a warfare of affidavits, and now somebody had to pay for them.

Mr. Higgins said one of the plaintiffs was a Director of a rival Gas Company, and was very angry.

Mr. Glasse followed for the plaintiffs, and said, assuming there was justification for issuing the writ, inasmuch as the road was destroyed, stones were being thrown, and there was considerable damage, what then became the duties of the parties? If the defendants really meant to remedy it, what they should have done would have been to say "We have done all this; we are sorry for it, we will not do it any more. Do not go any further with your action; we will submit and pay costs up to the present time." But they had filed an enormous number of affidavits which had nothing to do with the real question, which was whether there was a good ground for the suit on the 21st of December. All the affidavits went to show was what had been doing since, which, he contended, admitted the nuisance. Therefore the whole question was whether on the 21st of December, when the writ was issued, the plaintiffs had good cause of complaint. This, he contended, was abundantly made out, and, therefore, asked for the costs of the action

The Vice-Chancellor said he did not understand why, when the injunction was obtained on the 23rd of December, the defendants did not say they were not going to do the plaintiffs any harm.

Mr. Higgins: We have always said so.

Mr. Glasse replied that they must not only have said that they were not going to do the plaintiffs any harm, but that they would pay costs up to that time.

The Vice-Chancellor: What is the population of Longwood?

Mr. Higgins: About 5000.

The Vice-Chancellor: Is there a large consumption of gas?

Mr. Higgins: Yes, my Lord.

Mr. Glasse said there must be, because by the Act of Parliament their capital was £44,000, and they had power to raise additional capital to the extent of £25,000. There were about 25 mills there. They seemed to have used an "affidavitometer."

The Vice-Chancellor said everybody must agree there were too many affidavits on each side.

Mr. Glasse said that might be so, but it was for his lordship to say who was to pay for them.

Mr. Higgins said the Court had only heard of two grounds of complaint—one about the occupation road, and the other about the blasting and the hurling of stones in the excavations for the gasholder. He should confine himself to those, and leave out the other topics, such as apprehended injury to a cottage of the plaintiffs and the boundary wall of the plaintiffs. He asked that the action might be dismissed with costs. As to the occupation road, the plaintiffs never were entitled to an injunction, because the whole of the excavations affecting it were completed by the defendants about the 10th of December, 1876. The plaintiffs knew that perfectly well, because they were within a few yards of the *locus in quo*, and knew nothing more was to be done. In respect to the blasting, the matter stood thus: There was no evidence of a stone having fallen on the plaintiffs premises on any particular days, except, at the outside, four days—Aug. 30, Dec. 11, Dec. 12, and Dec. 14. As to the stone that fell on Dec. 12, which was said to have hit a man named Hoyle on the head, all he could say was that a stone falling a great distance on a man's head must have had some result; but when he was seen he said it did not hurt him, and he thought his lordship would come to the conclusion that that complaint was of small importance. As to the blasting, what happened in August came by great surprise on the defendants. They commenced to reinstate the matter, and do all they could to put the plaintiffs right. They repaired the roof, and gave them full satisfaction long before December. After the accident in August, Mr. Pearson, the contractor, took all the precautions he could, and there appeared to have been no accident of any sort, and no ground of complaint, from the 30th of August until the 11th of December. Upon that date it was said a stone fell on the skylight, and Hoyle was struck, and that on the 12th and 14th stones came over the shed. The defendants had great doubt about that. A stone was said to have been flung over a mill 60 feet high in a manner almost physically impossible. On the 14th of December, when that happened, Mr. Pearson, the contractor, saw one of the plaintiffs, went into the matter with him, and agreed so to arrange the blasting operations that it was absolutely impossible for any accident to occur, and he undertook that no more blasting of any kind should take place till the precautions were complete. Mr. Pearson said he would so arrange the blasting that no stone should fly to the plaintiffs premises. He would erect a gallery to cover the blasting operations, so as to enclose the *locus in quo* where the blasting operations were going on. He stopped the blasting altogether from the 14th to the 18th, in accordance with his promise. On the 18th of December he finished the construction of the gallery which he was then making; he covered it in with planks, and from that day forward there never had been a pebble thrown on the plaintiffs land or outside the gallery. It was physically impossible for any kind of damage or risk to be occasioned to the plaintiffs. That was completed five days before the writ, and certainly within the eyesight of the plaintiffs, who were lookers-on.

Mr. Rigby replied that Mr. Pearson stated he did make the promise on the 14th, and proceeded forthwith to give effect to it. The occupation road remained intact from the early part of September until November.

In November there were one or two small slips in the road. On Dec. 15 there was a larger slip, and on Dec. 28 another slip.

The VICE-CHANCELLOR intimated an opinion that he thought it was unnecessary to come to the Court about the road.

Mr. HIGGINS said there was nothing to complain of about the road until the slip of the 15th of December, and then there was no real damage done. On the 20th of December there was a slip. The cause of that was that there was a drain which came along the road from the plaintiffs premises to the defendants premises.

The VICE-CHANCELLOR said if there was a slip caused by the defendants works they were bound to replace it.

Mr. HIGGINS: We did. That slip never would have occurred but for the wrongful act of the plaintiffs themselves. There was a drain coming along the road from the plaintiffs premises on to the defendants premises. Some years before the Huddersfield Water Company had put some of their main-pipes on the road, and the plaintiffs disconnected a drain from the brook in consequence. At the time the Water-Works Company laid down the drain, the brook was dry, and they did not think the drain was of any importance; but in winter that drain became very important, and owing to what the plaintiffs themselves did, that drain discharged itself into the road, and owing to the geological structure of the road, the effect was that of which the plaintiffs complained, but which, in truth, they had caused.

The VICE-CHANCELLOR said he thought the justice of the case would be met by leaving both parties to pay their own costs. There had been undue haste on the part of the plaintiffs, and unjustifiable resistance by the defendants.

Mr. HIGGINS repeated that the subsidence of the road was owing to the unreasonable course the plaintiffs had taken. The real damage having occurred on the evening of the 20th of December, the defendants at once, without a moment's delay, on the 21st of December, had planks put upon the road, and the men were there for the purpose of commencing the repairs before the writ was issued. In fact, they had commenced those repairs and had completed them, and had the road in perfect order by the 27th. The question, then, was, what the damage was the plaintiffs had sustained. No doubt the road was narrowed for six days, but the traffic was never stopped for a minute.

The VICE-CHANCELLOR: Can you get to your mill in another way?

Mr. RIGBY: Yes, my lord, but by a much more inconvenient way. The other road is never used.

Mr. HIGGINS said there was no evidence of a cart being stopped for a minute. In order to prevent any risk, the defendants put up a gas-lamp, and did everything they could to prevent inconvenience. It was not shown that the plaintiffs had suffered a shilling's worth of damage. Being brought to Court, the defendants looked into their rights. They said the plaintiffs were attacking them, and they had been polluting their water for years. He offered to have a single inch pipe placed where the water came to the plaintiffs, so that the defendants might have a supply of pure water.

Mr. RIGBY said the defendants had water from the Huddersfield water-works, and they could have it to any extent they liked.

Mr. HIGGINS replied that in consequence of the plaintiffs polluting the water the defendants were compelled to get water from the Huddersfield water-works, and pay £12 a year for it.

Mr. CALDECOTT (on the same side) said the Court always considered the circumstances of the case, and there was no absolute rule, that the defendants should pay costs, such as that upon which Mr. Glasse had relied. The plaintiffs had commenced the litigation hastily, and unnecessarily, and therefore they ought to pay the costs. He then proceeded to read affidavits.

The VICE-CHANCELLOR said if the defendants had conducted their case more reasonably he might have dismissed the Bill with costs.

Mr. CALDECOTT hoped his lordship would do so now. He then continued with the further reading of the affidavits, on the number and length of which his lordship constantly expressed his great dissatisfaction. The learned counsel said, as to the counter claim, the brook which was alleged to have been polluted came from the defendants premises, and afforded them a convenient mode of obtaining water.

The VICE-CHANCELLOR said the plaintiffs had made a claim against the defendants, and the defendants thought they would make a claim against the plaintiffs.

Mr. CALDECOTT said that probably the defendants would have brought a separate action.

The VICE-CHANCELLOR: I think this is a mere afterthought.

Mr. CALDECOTT said if the defendants had not been attacked they would have gone to their neighbours and put their case before them, and if those neighbours had been reasonable, they would have acceded to their request.

The VICE-CHANCELLOR. I shall not go into that.

Mr. CALDECOTT: I must ask your lordship to do it, because it is a matter of their fouling a brook as far back as 1859.

The VICE-CHANCELLOR: You must file a new claim, then, if you insist upon it.

Mr. CALDECOTT: I hope you will not put us to that expense.

The VICE-CHANCELLOR: Yes, I shall.

Mr. CALDECOTT: That has not been objected to.

The VICE-CHANCELLOR: I object to it very much.

Mr. CALDECOTT: The plaintiffs do not.

The VICE-CHANCELLOR: I shall not prejudice you in the slightest degree, because I strongly suspect it is a mere afterthought.

Mr. RIGBY was then heard in reply, and said it was the first time that defendants had made it a merit that they had not disobeyed the injunction of the Court. They picked out certain affidavits by which it was possible to reduce the case to an absurdity, no doubt. Mr. Pearson's evidence about the stone on the 11th of December was totally inaccurate, especially when he said that the stone could not be found. The evidence of two workmen in the employment of the plaintiffs showed that the reason why the stone could not be found was because the dye-house was full of steam; but the stone was found the next day.

The VICE-CHANCELLOR: Did you write and say that you must take proceedings unless the defendants desisted.

Mr. RIGBY said it was no use writing when they could see them by merely walking over to their premises. The plaintiffs witnesses, one of them being the Borough Surveyor, said that not only actual damage was sustained, but there was the fear of much more substantial damage being apprehended. Mr. Crowther said, in his judgment and belief, the surface of the plaintiffs mill-yard, together with the boundary wall, would, long before the completion of the excavation, if continued as hitherto carried on, have slipped away. Judging from what was done before, was it not certain that, if the action had not been commenced, that would have been so? The plaintiffs had proved by the evidence that it was only under stress of the order of the Court that the danger was prevented. When persons were carrying on a large business, and when their Surveyor told them that the road would be lost which led to their mill, or would slip away before the excavations were finished, it was essentially an important matter, taken together with the fact of the danger to all the workpeople from the stones flying about.

The VICE-CHANCELLOR: When was the fixing of the gasholder completed?

Mr. CALDECOTT: In June, 1877, I am told.

Mr. RIGBY said he could not have imagined a case in which it was more proper to come to the Court when the contractor acknowledged that what was complained of was owing to the carelessness of the workmen.

The VICE-CHANCELLOR, in giving judgment, said the plaintiffs were carrying on large dye-works at Longwood, near Huddersfield, and the defendants were the Longwood Gas Company, and Mr. Pearson, their contractor. They had premises immediately joining the plaintiffs, and were excavating in the summer of 1876, particularly in the months of August and September, for the purpose of erecting a new gasholder of very large dimensions—namely, 100 feet in diameter. Longwood was said to be a place in which there were 25 mills, and in which, therefore, the consumption of gas would be very large. In the course of excavating for the erection of the new gasholder, it became necessary to carry on some blasting operations, and in the months of August and September, and down to the middle of December, 1876, some inconvenience, and he thought some danger to the plaintiffs, arose in consequence of the operations of the defendants; but he was satisfied, upon the evidence, that there was no blasting after the 14th of December, which could not be guarded against by the defendants, or which the defendants were not perfectly willing to do everything that was necessary, under the circumstances, to protect the plaintiffs against. He was satisfied that since the 14th of December, 1876, they had not experienced any inconvenience from the blasting operations. There was an accommodation road, which was somewhat more than 20 feet wide, and, for the purposes of these works, the defendants caused the slipping down of a part of the road, so that at one time the 20 feet was reduced to about 9 feet. But he was satisfied that there never was on the part of the defendants any intention of permanently interfering with the road. He was also satisfied, from the evidence of the Contractor and the Manager of the defendants works, that the interruption would be a temporary one, and that in a few days whatever was done would be set right again without the institution of the suit. The writ was issued on the 20th of December, and then the very unusual course was taken on the 23rd of December of attending before Mr. Baron Pollock, who was the Vacation Judge, and upon the representation made to him he granted an interim order extending until the second motion day in Hilary sittings. The matter came on on the 15th of February, when Mr. Glasse addressed the Court for a few moments, and upon the representations then made the interim injunction was continued, no one appearing for the defendants. The injunction came to an end some time afterwards. He was perfectly satisfied that a little forbearance on the part of the plaintiffs would have rendered the suit totally unnecessary. The operations of the defendants were substantially over; and had it not been for some very angry feeling, he was perfectly satisfied that to come to the Court was wholly unnecessary, either on account of the blasting, or the interference with the road. He could attribute the institution of the suit to an angry feeling between the parties, who had indulged in filing affidavits. What ought, therefore, to be done? He was much inclined to think that if the defendants had adopted a reasonable course—that is, if they had put in a short affidavit, or written a letter saying they did not intend to excavate any further, and would take every proper precaution—the whole litigation might have been brought to an end. Instead of that, they filed very long affidavits, which were replied to by the plaintiffs by another long batch of affidavits. An injunction was useless, because it was admitted that the work was over and the gasholder fixed. It was a mere question of costs. As to these he thought both parties had been very unreasonable and vexatious, for which they both richly deserved to suffer in costs. If the defendants had conducted their defence properly, he thought he should have dismissed the Bill with costs. But, instead of being reasonable, they had been as vexatious on their side as the plaintiffs had been on theirs. He came to the conclusion that both parties had been so wrong that he should dismiss the Bill without costs. As to the counter claim, he declined hearing it, because it was not a counter claim arising out of the dispute. That would also be dismissed; and, desiring to make the defendants suffer for the length of the affidavits, he should dismiss the counter claim with costs.

Mr. CALDECOTT: That is without prejudice to any action with reference to the right to the water?

The VICE-CHANCELLOR: If you wish it.

STAFFORDSHIRE SPRING ASSIZES.—TUESDAY, MARCH 26.

(Before Justice DENMAN *and a Jury.)*

TURNER *v.* HEDNESFORD GAS COMPANY.

Mr. POWELL, Q.C., and Mr. ANSTIE appeared for the plaintiff; Mr. MATTHEWS, Q.C., and Mr. YOUNG for the defendants.

The plaintiff in this case is a contractor, of Wednesfield, and the action was brought to recover damages from the defendants, a Gas Company in Staffordshire, for breach of contract. The plaintiff alleged that, having agreed with defendants to construct a gasholder-tank for them for the sum of £745 5s. 3d., the defendants, on Aug. 13, 1877, prevented him from proceeding with the work, and seized his tools and plant. The defendants alleged, in reply, that the plaintiff failed to carry out the works with reasonable expedition, or to carry out the instructions of their Engineer, Mr. Thomas Proud, and that, therefore, in accordance with the provisions of the agreement, the defendants took the work out of plaintiff's hands, and also took possession of materials to the value of £30. They denied, however, having taken possession of any tools. The defendants had also made a counter claim against the plaintiff and one William Round, the plaintiff's surety, in which they alleged that, by reason of plaintiff's default, they had to pay for the tank £254 14s. 9d. more than they would have had to pay under the contract.

Mr. POWELL, in opening the plaintiff's case, said that on the 2nd of July, 1877, a contract was entered into between the parties, under which plaintiff was to construct a brick gasholder-tank for defendants for the sum of £745 5s. 3d.; but before he could complete it the defendants interposed and prevented him executing the contract. It was a part of the contract that the work should be carried out according to specification, and the specification contained the following provision:—"The whole of the work will be carried out to the entire satisfaction and under the superintendence of the Company's Engineer, Mr. J. M'Millan, of Stoke-on-Trent, and all questions as to the quality of materials and workmanship shall be judged by him, and his decision shall be final and binding upon the Contractor." Mr. M'Millan set out the ground, and the work was commenced early in July. The plaintiff carried it on into the month of August, and that without any intervention on the part of Mr. M'Millan. Plaintiff was doing the work well and properly, and in accordance with the specification. On the 24th of July, at which time plaintiff had done work in respect of which £150 was paid him, the scene was visited by a gentleman unknown to the plaintiff, and who inspected the works. The plaintiff knew the gentleman was an Engineer, but, inasmuch as he was

conscious of doing his work well, he did not much care who he was. On the 30th of July the same gentleman came again, and then stated that his name was Proud, and that he had become Engineer to the Company in the place of Mr. M'Millan. In that capacity he went over the works, but made no complaint. In a day or two afterwards, however, a person employed by the defendants upon the works brought a telegram to the plaintiff, which he said he had received from Mr. Proud. The message required that elm planking should be put under the brickwork of the tank. The specification said nothing about planking, and also provided that no extras should be charged except for additional work done on the written order of the Engineer of the Company, the Engineer of the Company being, as shown by the contract, Mr. M'Millan. Under these circumstances plaintiff took no immediate step. The next day Mr. Proud himself came over, and ordered the work to be done which was referred to in his telegram. No written order, however, was given, and the plaintiff went on with the work as before until Saturday, the 11th of August. On the following Monday he and his workmen were shut out of the ground by an officer of the Company, and were not even allowed to fetch away their tools. On the 14th of August the plaintiff went to Mr. Proud, at Birmingham, and asked for an explanation. Mr. Proud professed not to understand the matter, and referred the plaintiff to the Company. The next day the plaintiff went again to Birmingham, and met Mr. Proud with one of the Directors. He was simply asked whether he was willing to give up the contract. He replied that he was, upon proper terms. Plaintiff was told that there was a meeting of the Directors on the 25th, which he might attend. He attended, but was not admitted. When the Directors had finished their deliberations, plaintiff was told that he would be written to, and he afterwards received the following resolution:—"The question of Mr. Turner's claim was fully considered, and the Directors feel that they have no alternative but to abide by the specification." Plaintiff was willing to abide by the specification, and asked for damages. Respecting a counter claim of £254 15s. 9d., set up by the defendants, it was submitted on behalf of the plaintiff that he had nothing to do with it, inasmuch as it was a matter between one of his sureties and the defendants.

In support of the case plaintiff himself was examined, as was also the foreman of his works, Mr. John Gough, and a Civil Engineer, Mr. James Cope.

WEDNESDAY, MARCH 27.

Mr. MATTHEWS addressed the Jury in defence, and contended that the contract had not been carried out by the plaintiff in a manner satisfactory to the Company's engineer. Mr. Proud found that plaintiff had not carried on the work in accordance with the contract. If plaintiff had been allowed to proceed with the work as he was doing, it would have resulted subsequently in danger to the property of the Company. The most essential feature in the erection of the tank—viz., puddling—had been neglected, and there was danger of the walls falling in from want of timbering.

The *Secretary* of the Company proved that Mr. Proud was the Engineer appointed on the 28th of July.

Mr. *Proud* was then called, and stated that he had had large experience in constructing gasholder-tanks. He made an examination of the works, and found that the sides of the tank were in such a condition that they would have fallen in, as the proper timber supports were not put in. His instructions as to timbering were not carried out. It was absolutely necessary that such timbering should be attended to, in order to construct a proper tank. The Company had to purchase timber to complete the necessary work.

Cross-examined by Mr. POWELL, witness admitted that there was no mention of the planking in the specifications, and that he had never given plaintiff a written notice to put in elm timber.

Mr. *Lycett*, the Manager of the Company, was called, and stated that he examined the work on the 30th of July. There was only a small portion of brickwork, and the sides of the tank were falling in from want of timber support. If the tank was to be constructed properly, timbering would be required, which the plaintiff had not put in. In his opinion, he considered that plaintiff knew nothing about the erection of such tanks. The way in which plaintiff had gone about the work caused it to be "the laughing-stock of the place." With regard to the alleged detention of the tools, nothing had been retained but what was provided for in the specification.

Mr. *John M'Millan* was then examined, as was also Mr. *Smith*, a contractor of Stoke-upon-Trent. The latter agreed to do the work for £850, and took it in hand after the plaintiff had left it. On examining the work he found it in a tumble-down state, and he had to construct a new tank and alter the site, as there was not room to erect the new one. In his judgment, he should consider the value of the work done by plaintiff to be about £100.

Witness, in cross-examination, stated that the materials which had been sent by plaintiff were left there; but, so far as he knew, he could not say that any of them were used in the construction of the new tank.

Mr. *Field*, contractor, and Mr. *Hazelour* gave corroborative evidence.

His LORDSHIP having summed up,

The JURY, after a short deliberation, gave a verdict for plaintiff—damages £200, in addition to the sum of £150 which had been received by him. The counter claim was thrown out.

SURREY ASSIZES, KINGSTON.—SATURDAY, MARCH 30.

(*Before Lord* COLERIDGE *and a Special Jury.*)

WATTS *v.* THE WEST SURREY WATER COMPANY.

The plaintiff was a brewer, and the action was brought against the defendants for not supplying him with good and pure water fit for brewing, in consequence of which, as he alleged, he had lost some thousands of pounds he had invested in a brewery on the faith of a good supply.

Mr. GRANTHAM, Q.C., and Mr. LANE were for the plaintiff; Mr. WATKIN WILLIAMS, Q.C., and Mr. M'MILLAN for the defendants.

It appeared that the Company were incorporated by Act of Parliament for the supply of the district with water, and one of the clauses of their Act was that they might supply any person with water for other than domestic purposes, on such terms and conditions as might be agreed on between them and the party wanting the supply. In 1876 the plaintiff, a brewer, proposing to establish a brewery at Addlestone, within the Company's district, went to the Chairman of the Company and asked whether the Company's water was fit for brewing, and he replied that it was, and referred him to one Saunders, "to make inquiries on the subject." The plaintiff accordingly saw Saunders, as to whose office or position in the Company there was no express evidence, and he made certain statements to the plaintiff as to the Company's water, after which the plaintiff set up his brewery, which was supplied with water from the works of the Company. The brewery failed, as he alleged, through the bad quality of the water, and he accordingly brought this action, in which he sued the Chairman and also the Company, and complained that they, by the Chairman, and also by Saunders, who, he alleged, were authorized for the purpose, "informed and warranted" him that the water would be "good and pure, and fit for brewing family ales," whereas it was not so, and, on the contrary, was bad, impure, unfit for brewing family ales, contained matter injurious to health, and was unfit for use. The plaintiff, before he discovered the bad character of the water, brewed large quantities of beer and family ales, which, in consequence of the bad quality of the water, were rejected by his customers, and so his brewery was ruined, and he lost £10,000. The Company in their answer denied the alleged warranty, and denied that any one had been authorized to make it.

At the opening of the proceedings,

Lord COLERIDGE intimated that, in his opinion, there was no case against Mr. Hook, the Chairman, and he was accordingly dismissed from the action.

The *plaintiff* was then called to prove the alleged warranty by Saunders, to whom he had been referred by the Chairman "to make inquiries on the subject."

Mr. WILLIAMS objected that there was no authority to make the alleged warranty, and

Mr. GRANTHAM admitting that he had no express evidence that Saunders was a general manager,

Lord COLERIDGE held that, in the absence of any further evidence as to his authority, he should hold that he had no authority to make such a warranty.

Mr. GRANTHAM made an attempt to support the case, on the ground that the water was not good and pure, and that thus, apart from any warranty, the action could be maintained; but

Mr. WILLIAMS urged that this was not the case made by the claim, which was really founded on the warranty.

Lord COLERIDGE was of that opinion, and, therefore, held that the action failed, though, on Mr. Grantham's application, assented to by Mr. Williams, he said he would give leave to the plaintiff to amend his statement of claim, on the payment of the costs which had been occasioned by the claim in its present form.

BROMPTON COUNTY COURT.—WEDNESDAY, APRIL 10.

(*Before Serjeant* WHEELER, *Judge.*)

LABOURERS AND THEIR WAGES.

William Penn, late a stoker in the employ of The Gaslight and Coke Company at their Fulham Station, brought an action against the Company to recover the sum of £1 4s. 11d., wages due to him at the time of his dismissal from the service of the Company.

Mr. HAYNES appeared for the plaintiff, and Mr. NEWMAN for the defendants.

Mr. HAYNES, in opening the case, said the question was one of great importance, as his client was one of a large gang of men who had been summarily dismissed from the Company's service for refusing to do work other than that which they were specially engaged to do; the Company at the same time declining to pay them the wages due at the time of their dismissal. He called

William Penn, the plaintiff, who stated that he had been in the employ of the Gas Company about two years. The gang he belonged to were engaged in charging the retorts used in making gas, it also being their duty, once a month, to chip the left side of the mouths of the retorts, another gang doing the right-hand side. The witness explained that the chipping was rendered necessary, owing to the quantity of tar and other matter corroding on the mouths of the retorts. On March 14 the plaintiff and his mates had finished their day's work, when the foreman stoker came up and ordered them to commence chipping the right-hand sides of the retorts. This they declined to do, as it was no part of their duty, and they had never before done it. Upon this they were dismissed from the employ, and informed that the wages due to them were forfeited.

Several other men forming part of the gang were called in corroboration, and stated that they had been at the work several years, and had never once been called upon to chip the right-hand sides of the retorts; they had always done the left.

Frederick Machell, chief foreman stoker, said it was by his orders the men were told to chip the right sides; they had never done it before. When they declined to do it, a quarter of an hour was given them to consider the matter; but as they steadily refused, they were immediately sacked.

Mr. *F. M'Minn*, resident Engineer to the Company, said he had never before known the men to refuse to change over; in the present case it was absolutely necessary that it should be done. He spoke to the men, and told them that, by the fact of their declining to do their legitimate work, they had forfeited the pay due to them.

The JUDGE, in summing up, said it was clear to him that the plaintiff had performed the duties assigned to him, and he had acted very properly in declining to do any other work; he had been corroborated by several witnesses, who gave their evidence in a clear and truthful manner, and he believed their word, although they were only poor working men, the same as he would that of the highest person in the land if he were brought before him. He should give a verdict for the plaintiff for the full amount claimed, with costs.

BRIGHTON POLICE COURT.—WEDNESDAY, APRIL 3.

(*Before Mr.* A. BIGGE, *Stipendiary; Alderman* MARTIN, *and Mr.* HOLLIS.)

THE CORPORATION OF BRIGHTON *v.* COWELL.

ILLEGAL USE OF WATER.

Samuel Cowell, provision dealer, North Street, was summoned "for that he, on the 22nd day of March, 1878, having from the Corporation of Brighton a supply of water for other than domestic purposes, to wit, for one horse and one carriage, did use for other purposes than those for which he was entitled to use the same, to wit, for two other horses and three carriages, the water supplied to him by the said Corporation, contrary to the statute in such case made and provided." The proceedings were taken under the 26th and 27th Vict., sec. 18.

The TOWN CLERK appeared to support the complainants; the defendant being represented by Mr. F. MERRIFIELD.

Mr. *H. Beach*, one of the inspectors of the Corporation Water-Works, said he inspected the premises occcupied by the defendant, 48a, Portland Street, on the 19th of March last. The premises were stables, and he found in them three loose boxes, two horses, and a pony. There were two vans, one cart, and a four-wheel chaise there. At that time he did not know what water-rate Mr. Cowell was paying. He also saw the adjoining premises on the 22nd of March.

Cross-examined by Mr. MERRIFIELD: Witness examined the premises in Mr. Lambert's time, about the end of 1876, and he remembered that Mr. Lambert had a pony and a potato van. The visit on the 19th of March was the first visit of inspection he had paid since defendant had been in possession.

Mr. *Holland*, manager of the water-works, produced an account of the water-rate against the defendant, which was for trade purposes. The amount of charge was £1 3s. 6d. No contract had been made by the defendant for water supplied to him by the Corporation.

Mr. MERRIFIELD submitted that, that being so, there was an end of the case. The Corporation should have made a contract with him, or made any charge they thought proper.

Witness said that there had been previous contracts made with Mr. Lambert and Mr. Hopkins.

Mr. MERRIFIELD could not see how the contracts of the two former tenants were binding on his client.

The TOWN CLERK: I shall be able to show that he has made it binding by paying the same amount as the previous tenant.

Mr. MERRIFIELD said the Corporation had assumed, without taking the trouble to go and see, that the number of horses and vans were the same as before.

The TOWN CLERK said, by the Act of Parliament, the tenant had no right to use the water until he came to the Corporation and made a contract.

Mr. MERRIFIELD: My contention is that my client paid whatever he was asked to pay, and that he would have paid all he was asked to.

Witness stated the premises occupied by Mr. Lambert were rated at 10s. 6d., those occupied by Mr. Hopkins, adjoining, 13s., making £1 3s. 6d. in all, though they had separate entrances. Defendant had made no application for an increased supply of water, nor given any notice with reference to it. He had occupied the premises about twelve months.

The TOWN CLERK proposed to ask witness what the Corporation charges were for the number of carriages and horses the defendant had.

Mr. MERRIFIELD objected to this question, and said there was nothing to guide any one as to the charges, until they were brought to the Court in this way. He contended that, in the accounts sent, there were no particulars of how many horses there were, or how many carriages.

Mr. *W. Smithers*, one of the collectors for the Corporation Water-Works, proved that, for the two half years, 1877, 5s. 3d. each had been paid, making 10s. 6d., by the defendant, in respect to the premises, 48A, Portland Street. That was a special charge, not a rate, for a supply for other than domestic purposes.

In cross-examination, witness said the demand-note set forth 5s. 3d. for stable; that was all the information given to the tenant. The receipts were more vague, merely saying for water-rate and charges. All the conversation he had with defendant was that he said the charges were high enough. No conversation as to the number of horses and carriages the defendant kept took place, and witness never suggested that he ought to pay more. Supposing a person did not know what he had to pay per carriage or per horse, the only instruction he had was on the back on the demand-note. The same amount was paid by the previous tenant.

The TOWN CLERK said he now proposed to ask what was the scale charge for the number of horses and carriages the defendant kept.

Mr. *Holland* was recalled, and, in reply to the TOWN CLERK, said the sum payable for the carriages and horses found on the premises of the defendant would be £2 12s. 6d. per annum.

Witness, in reply to Mr. MERRIFIELD, said the Water-Works Committee decided as to the special contracts. They charged 10s. 6d. per stall generally, but in the case of Mr. Lambert they charged for one only, because they knew he had only one. Defendant had given the Corporation no chance of making a contract, because he had gone on using the water surreptitiously. Defendant had no right to use the water without coming down to the water-works office and giving notice. If he had done so, it would have saved all this trouble.

Mr. MERRIFIELD said there was another thing that would have saved trouble, and that was if the water-works people had gone down to defendant and told him that the price to pay for what he kept was £2 12s. 6d. For the defence, he submitted that Mr. Cowell took possession of the place from a Mr. Hopkins, and he had not the slightest motion that the Corporation charged according to the number of horses and carriages. He thought the use of the word "surreptitiously" on the part of last witness was utterly unjustifiable, and could only have arisen from his ignorance of the English language. He argued that no contract had been proved with the defendant, and on this head the case fell to the ground. Then supposing there had been a contract, it was assumed that the contract of the former tenant was binding on the defendant. That, he contended, was the fault of the Corporation, who should have sent an inspector down to the premises, or have taken the consequence. Further, he argued that no intimation had been given to the defendant by the Corporation, and that if the law could sustain this summons, the mode of conducting the business of the Corporation water-works was most unfair. There was nothing in the demand note, he thought, that could inform Mr. Cowell as to what he was expected to pay, and therefore, under all the circumstances of the case, he asked the Bench to dismiss the summons.

The Magistrates retired for a few minutes, and on their return,

The STIPENDIARY said the case turned chiefly on the instructions set out on the back of the demand-note, from which it appeared that defendant was liable to a penalty not exceeding £10 if he did not enter into a contract. He must, therefore, be held to have adopted the contract of the previous tenant, Mr. Hopkins, who had one horse only, but had used a great deal more water than he was entitled to under that contract. The Bench would, therefore, convict him under the clause of the Act; but as the Corporation had the right to sue him in the County Court for the water so misused, a fine of 5s. and costs would be imposed.

SURREY COUNTY BENCH, KINGSTON.—THURSDAY, APRIL 11.

(*Before Major* LAMBERT *and other Magistrates.*)

SECURITY FOR GAS-RATES.

William Richard Colyer, landlord of the White Hart Inn, Walton, was summoned for neglecting to give security for a supply of gas from the Walton Gas Company.

Mr. GEORGE HARDEN, Secretary to the Company, said that in March last a Mr. Chiddam occupied the house now kept by defendant, and left in that month, paying up all that was due from him for gas supply. When the defendant took possession of the premises, witness went to him and asked him for a deposit of £2, but this he refused to give. Afterwards a deposit of £3 was asked for, but that he also declined to pay.

Defendant, who was represented by Mr. BUCKLAND, expressed himself willing to pay for the gas a quarter in advance, but he was not content to pay a standing deposit for the Company to do as they liked with.

The BENCH made an order fixing the deposit to be paid at £3, and directed defendant to pay the costs, 12s. 6d.

SOUTHWARK POLICE COURT.—TUESDAY, APRIL 2.

(*Before Mr.* BENSON.)

SHAW *v.* THE SOUTHWARK AND VAUXHALL WATER COMPANY.

The plaintiff in this case, who is a printer, residing at 66, Borough Road, summoned the defendants for unlawfully refusing to supply him with water during the time for which the rates for such supply had been tendered by him.

Mr. WHEELER appeared for the complainant; and Mr. LANFEAR, Solicitor to the Water Company, conducted the defence.

Mr. WHEELER said the whole case turned on an agreement which plaintiff alleged was entered into between him and the Company some four or five years ago. The plaintiff, desiring a larger supply of water, for trade purposes, thought it desirable that he should, under the provisions of the Act of Parliament, get a meter. He did this, but there was some altercation concerning it. The result was a compromise, by which the Company agreed to accept in payment of any water that should be used by plaintiff three guineas per annum. That was some time in 1872 or 1873. The plaintiff undertook not to use the meter, and he was to receive water at three guineas per annum, payable half yearly. The agreement was acted upon, and plaintiff was duly supplied with water, he making half-yearly payments of £1 11s. 6d. Some time ago, however, the Company determined to raise their rates, and in October, 1877, the plaintiff received from them an account for the half year ending the previous September of £2 7s. 6d., instead of £1 11s. 6d., as he had previously paid. Plaintiff was surprised at the Company ignoring the agreement, and he wrote to them, calling their attention to the supposed error which had been committed. In reply, he received a note, in which it was stated that the charge made in respect to the house had been revised, the premises having previously been underrated. Nothing was said about the agreement. On the 20th of March last plaintiff went to the office of the Company, and tendered payment of £1 11s. 6d., but it was refused.

Mr. BENSON: Did he not pay the September water-rate till the following March?

Mr. WHEELER said the ordinary practice had been to pay five months in arrear.

Mr. BENSON: My Water Company have never given me six months credit. May I take it that he went on the 20th of March to pay the September rate?

Mr. LANFEAR: Such was not the customary time.

Mr. WHEELER said it was, in the plaintiff's case, the "habitual time."

Mr. BENSON: In fact, you say they gave him five months credit?

Mr. WHEELER said, that being the case, two days after the money was tendered——

Mr. BENSON: But the demand was for £2 7s. 6d.?

Mr. WHEELER said two days afterwards men were sent, and the water was cut off. That was a proceeding upon which he could not lay too much stress, as it stopped the plaintiff's trade, and cause his type, &c., to lie idle for several days. Plaintiff, of course, suffered great injury and damage by this proceeding on the part of the Company, and after some consultation with his friends, it was decided to take out a summons against the Company. There was a little irregularity in the summons.

Mr. BENSON said he failed to see where the irregularity was. It set forth that the Company, having undertaken to supply the water, had unlawfully refused to do it. To what particular section was attention to be directed?

Mr. WHEELER reminded the Magistrate that directly after the summons was issued the water was turned on again, and he relied on that as showing that the Company felt they were in the wrong.

Mr. BENSON said if he had not been of opinion that the Company had done something wrong, he should not have granted the summons; but what he now desired to be told was under what section plaintiff sought a remedy, or to enforce a penalty? As to the agreement, that was a matter of proof.

Mr. WHEELER said he relied on the 43rd section of 10 & 11 Vict., cap. 17, the Water-Works Clauses Act, 1847.

Mr. BENSON said that clause enacted that, "If, except when prevented as aforesaid, the undertakers neglect or refuse to furnish to any owner or occupier, entitled under this or the special Act to receive a supply of water, during any part of the time for which the rates for such supply have been paid or tendered, they shall be liable to a penalty of £10," &c. He apprehended, therefore, that the allegation of the plaintiff was that the Company had neglected to supply water during part of the time for which rates had been paid or tendered.

Mr. WHEELER said that was so. He depended to a great extent on the agreement, and did not purpose touching on the question as to the raising of the rates for such supplies of water. There had already been a case decided in this Court on that point. There the Company had cut off water, and the decision was against them.

Mr. LANFEAR said the case referred to did not bear upon the present one. There the money had been paid in advance, and by some inadvertence the cheque had been returned.

Plaintiff was then called, and examined by Mr. WHEELER. He said he had for some years carried on the business of a printer in the Borough Road. About 1873 he agreed to accept water from the Company at a certain rate, but finding that he used steam, the Company wanted him to pay £10 per year. He disputed that, and had a meter put on, when the Company made an agreement to supply him with water at £3 3s. per year, payable half yearly. That arrangement continued up to October last, when the Company decided on raising the rates, and a demand was made on him for £2 7s. 6d. for the half year ending September. He always paid his water-rate half yearly, within a few days of the next rate being due. He wrote to the Company about this extraordinary demand, and heard nothing more from them until the 20th ult., when he went to the office and tendered £1 11s. 6d., which he considered was the amount due. They refused to take this, and cut the water off a few days afterwards. The cutting off was done at the pipe outside, and that act, he considered, injured him in the eyes of his neighbours, and was unnecessary. He then took out a summons against the Company, and soon after they received it they put the water on again. He was eight days without water, consequently his business had been partially stopped, and a great deal of injury was done to him. When he took out the summons he doubted whether it would be successful, owing to the agreement to supply him not being mentioned.

Mr. BENSON said he was not responsible for the wording of the summons, but, as far as he could judge, it was correct, as it raised the question as to the Company giving a proper supply. He presumed what the plaintiff wished to argue was that, assuming there had been such an agreement, it was binding upon the Company, after the implied sanction by the operation of the agreement, to give a certain notice before altering the charge, as in this instance.

Mr. WHEELER said that was just so.

Mr. LANFEAR said the Magistrate might take it as a fact that there had been no decision as to the necessity of giving notice before the rates were raised.

Mr. BENSON said it was necessary sometimes to have recourse to exaggeration by way of illustration. If gas were supplied at so much per 1000 cubic feet, and one day a demand were made for tenfold the ordinary amount, would it be right to cut off the gas in two days afterwards? There was surely something of the same thing in regard to water. Was there nothing in the Water Company's Act directing that there should be a reasonable notice given?

Mr. LANFEAR stated that, under that very Act, notice had been given to the consumers as long ago as October. It should be remembered that plaintiff was tendering money six months after it had been due. He did not admit, however, that any notice was necessary.

Mr. WHEELER said after the summons was issued the water was turned on again, and an admission was made by one of the men that they had acted rather hastily in cutting the water off. The street was filled up again, and no action had been taken for the costs of opening it.

Mr. BENSON said he had very little doubt but that the Company had acted hastily. The only question was whether they had acted illegally. That was the only subject for argument.

In reply to the MAGISTRATE, it was stated that the money was tendered

on the 20th of March, that the water was cut off on the 22nd of March, and that it was turned on again on the 28th of March. Water was greatly needed in plaintiff's business for many incidental purposes, as well as for the steam-engine.

Witness, continuing, said he should not like to say what he had suffered through the water being cut off. The machine had to be turned by hand for two whole nights, so as to keep the best of his customers; and the water was sadly wanted to wash the types, formes, &c. The damage he had sustained was certainly not less than £5 per day. In fact, it would have better answered his purpose to have paid the money demanded, and the point could have been decided in the meantime. That was a course he thought the Company might adopt with their customers, instead of cutting off the water, as they had done in this case.

Mr. LANFEAR (to plaintiff in cross-examination): What is your consumption of water?

Witness: About 1000 gallons per week—sometimes more.

During the time you have taken water from this Company, have you been in the habit of paying your rates punctually when the collector has applied for them?—No.

Has he had to apply more than once?—Yes, I am very guilty in that respect. I do not pay my water-rates until the very last moment—just as the next quarter comes.

In fact, there has been a good deal of difficulty in getting them?—Yes; but that is no reason why I should be oppressed.

You admit that many applications had to be made to you for this particular rate?—Not for this, but for every one of them.

In further cross-examination, plaintiff said he received a notice on the 19th of March that, unless he paid the Michaelmas rate the next day, his water would be cut off. He then went and tendered the £1 11s. 6d., when the Company demanded £2 7s. 6d. He refused to comply with that demand, and on the following day his water was cut off.

Mr. BENSON said it did not matter whether the defendant was in arrears or not.

Mr. LANFEAR submitted that in order to enable plaintiff to take these proceedings, it was necessary, not only that he should have paid all the rates, but that he should have tendered the rate then in advance. That was clearly the case so far as the Act of Parliament was concerned. Plaintiff, however, only tendered £1 11s. 6d., and the Company's demand was £2 7s. 6d.

Mr. BENSON: Then you say he should have tendered in advance? Where is the section which enables you to cut off the water if the rate is not paid in advance?

Mr. LANFEAR said the Water-Works Clauses Act, 1847 (10 & 11 Vict., cap. 17), by section 70, gave the Company the right to demand payment of water-rates in advance, and by section 74 they had the right to cut off the supply if the rates were not paid.

Mr. BENSON: Is there anything in the Company's Special Act relating to this question?

Mr. LANFEAR said the Special Act provided that the whole of the Water-Works Clauses Act, with certain exceptions, were incorporated, and among the portions so incorporated were these two clauses.

Witness, examined by Mr. BENSON, said his premises were rated at £80 per annum, and he had but one water-closet on the premises. He was connected with the Company's high service on the main. He employed a 3-horse power engine.

Mr. BENSON said the Company had the power, no doubt, under section 70, to demand payment of the rates quarterly in advance. He wished to know whether in this case they had been so demanded.

Mr. LANFEAR replied in the negative, and he denied that any agreement had been entered into with the plaintiff. If the figures were worked out, plaintiff could be made to pay £13 3s. per annum, so that the Company could not be charged with acting harshly. Instead of that, plaintiff's rate was merely raised to £4 15s.

Mr. BENSON (to Mr. Wheeler): The premises may or not be underrated, but at present the subject of argument is the section either in the general or the local Act bearing upon the payment of rates under demand. How does plaintiff get over that?

Mr. WHEELER said his client had paid as he had always been in the habit of paying.

Mr. BENSON said it appeared to him that the Company had acted hastily in this matter, and the question was to what extent the clauses in the Act justified the conduct of the Company. In one part it was stated that if the rates were not paid on such and such dates, the Company had the power to cut off the water; and on reference to the clause respecting payment, it was stated that it was to be in advance. His sympathies were with the plaintiff, because he thought it was a hasty action on the part of the servants of the Company; but he could not shut his eyes to these two sections, and if these held good, the penal clauses of the Act of Parliament could not be enforced, except by a party who had paid his rates in advance. His ruling would be that, in order to enable any person (any consumer) to put in action the penal section of these Acts, it was incumbent on him to prove that he had paid or tendered the water-rate in advance.

Mr. LANFEAR said the Company did not take such measures, except for some good reasons.

Mr. BENSON said that he was of opinion that the Company had no right to alter the rates without giving proper and sufficient notice to their customers; but, at the same time, the complainant's rate was due in September, and he ought to have tendered it at that time. Instead of that, he allowed his rate to be unpaid until a few days prior to another quarter being due; therefore, he did not consider the complainant could enforce the penal clauses of the Act. The summons would be dismissed.

Mr. WHEELER said that he should consult his client whether it would be advisable to take a case for the decision of the Court above, as it was of the utmost importance to manufacturers and tradesmen.

GREENWICH POLICE COURT.—FRIDAY, APRIL 12.

(*Before Mr.* SLADE.)

ILLEGAL CONNECTION OF A METER.

Thomas Smith, of 9, Park Place, Lee Road, Blackheath, gas-fitter, appeared to a summons at the instance of the Phœnix Gas Company, charging him with an infringement of the Act 34 & 35 Vict., cap. 44, in connecting a pipe with the meter of the Company, after it had been previously disconnected by the Company, without giving 24 hours previous notice.

It appeared that, on the 28th ult., owing to the amount due at Christmas for gas consumed not having been paid, the Company disconnected the supply-pipe to the meter. The defendant, however, reconnected the pipe, and used the gas, the Company's officer afterwards paying a visit to the premises, when the pipe was again disconnected in such a manner that it could be replaced.

Mr. CARTTAR, on the part of the defendant, who pleaded guilty, said that no fraud was intended, and that defendant had paid the money due after the disconnection was first made by the Company. On the cards used by consumers, there was a printed notice cautioning consumers against disconnecting pipes from meters, but not against connecting, and defendant thought there was no harm in making the connection.

Mr. ALLEN, who represented the Company, said complaints against consumers were so numerous that it was felt necessary to take proceedings in the present case, so that it should be generally known what the law was. The summons had been taken out under the General Act, the penalty for the offence charged being 40s., but under the Company's Special Act, a summons might have been issued where the penalty was £5, and 40s. for each day such unauthorized consumption of gas took place.

Mr. SLADE said that the defendant, being a gas-fitter, ought to have known what the law was, and a fine of 20s., and 2s. costs, was imposed.

Miscellaneous News.

METROPOLIS GAS SUPPLY.

ABSTRACT OF THE QUARTERLY REPORT OF THE CHIEF GAS EXAMINER.—Professor Williamson, F.R.S., has issued his report on the gas supply of the Metropolis, for the quarter ending the 31st of March, 1878. The illuminating power of the gas supplied by the various Companies has been above the standard required by the Acts of Parliament. The average for the quarter has been as follows:—The Gaslight and Coke Company: Beckton, 16·6; Friendly Place, 16·9; Millbank Street (cannel gas), 21·5; Devon's Road, 17·8; Carlyle Square, 17·5; Camden Street, 16·8; Graham Road, 17·5; Ladbroke Grove Road, 17·5. South Metropolitan Gaslight Company: Hill Street, Peckham, 16·8. Sulphuretted hydrogen has not been present in the gas at any of the stations. The proportions of sulphur in other forms have been within the requirements of the Acts of Parliament, with the exception of a slight excess on one occasion at Beckton, North Woolwich, while the average at all the stations has been considerably below the maximum. The averages are as follow:—The Gaslight and Coke Company: Beckton, 11·6; Friendly Place, 11·2; Millbank Street, 16·6; Devon's Road, 10·4; Carlyle Square, 14·7; Camden Street, 16·1; Graham Road, 15·2; Ladbroke Grove Road, 12·3. South Metropolitan Gaslight Company: Hill Street, Peckham, 15·8. Traces of ammonia have been discovered in the gas at most of the stations; in no instance was the parliamentary maximum reached. The stations of the Commercial Gas Company at Wellclose Square and Parnell Road have been closed during the quarter, for repairs.

CAMBERWELL VESTRY.—At the meeting on Wednesday last, the Finance Committee reported the receipt of a letter from the South Metropolitan Gas Company, stating that the Company had reduced the price of gas, from Christmas last, to 3s. per 1000 feet, and had made a reduction in the charge for public lamps from £4 5s. to £3 19s. per lamp per annum, with a discount of 5 per cent. for payment within one month from the quarter, in lieu of the 7½ per cent. hitherto allowed. Mr. Colegrave moved the adoption of the report, which was seconded by Mr. Kemp, who said he thought the Vestry ought to acknowledge, with thanks, the communication from the Company. The report was adopted.

METROPOLIS WATER SUPPLY.

METROPOLIS WATER-WORKS (PURCHASE) BILL.

On Thursday last a deputation from the several Boards of Directors of the Metropolitan Water Companies waited upon the Home Secretary (the Right Hon. R. A. Cross) to urge upon the Government the importance of refusing to permit the Metropolitan Board of Works Bill for the Purchase of the Water Companies of London to be read a second time, or to allow the order for its second reading to be discharged, and of the whole question of the Water Supply of London being referred to a Select Committee. The deputation was introduced by Mr. Samuda, M.P., and there were also present, among others, Mr. Coope, M.P., Mr. Crawford, M.P., Sir Harcourt Johnstone, M.P., Lord Calthorpe, M.P., and Mr. Young, M.P.

Mr. SAMUDA, addressing Mr. Cross, said: I have the honour to introduce this deputation, which consists of the Chairmen and Directors of the principal London Water Companies, and their coming to you has resulted from a question that was put to you in the House of Commons by Mr. Fawcett the other night, when the Metropolis Water-Works (Purchase) Bill was called on. I had left the House at that moment; but it appears to me that the object of Mr. Fawcett in putting that question was to seek your interference and your assistance to enable the second reading of the Bill to be dispensed with, and to pass the Bill directly into Committee, as though it were an accepted condition on your part that the second reading was a mere *pro formâ* matter, and that the only matter to be discussed was that which would be duly and properly considered in Committee.

Mr. CROSS: I do not think that was the object of his question—I am sure it was not.

Mr. SAMUDA: I am happy, sir, to hear you say that; but they considered it so. Now, if such a proposition as is involved in this Bill had been brought forward from Manchester, Birmingham, or any of the large towns, it would have been of necessity in a private Bill, which would not be opposed in the manner in which this Bill has been, and an inquiry would have taken place in Committee upstairs. I believe if there was a private Bill for such a purpose, the feeling of the House would be not to reject it on second reading, but send the Bill upstairs. Mr. Fawcett says: "I would therefore ask the Home Secretary now or on any future occasion that he may prefer, whether he sees any objection to the order for the second reading of this Bill being discharged, and to the appointment of a Select Committee to inquire into the subject."

Mr. CROSS: The last part is quite right.

Mr. SAMUDA: That is evidently what he meant. The answer you gave exactly coincides with what we think would be the right thing—what ordeal this question should be submitted to.

Mr. CROSS: Would you remind me of what I did say?

Mr. SAMUDA: You said: "I am quite aware that this measure has given rise to considerable discussion as to the question of purchasing the sources of water supply for London. That is a very practical question. I should have liked well enough to have had this Bill discussed on the second reading, because there are two questions to be considered of considerable importance in regard to these Water Companies—(1) Whether it is wise that the Water Companies should all be placed under one management (that question came, to a very large extent, before a Committee of the House of Commons which sat not long ago); and (2) Whether, if such an amalgamation is desirable for London, the Metropolitan Board of Works is the proper authority under whom the undertakings ought to be placed."

Mr. CROSS: That is perfectly right.

Mr. SAMUDA: Now we think there is a very great public question involved in this matter, and that, unless a public benefit has been proved to exist, there is no justification for taking the unusual course of depriving the whole of these Companies of the position they stand in, at the present moment by reason of privileges obtained by them from Parliament. They urge, and urge I think indisputably, that they have submitted themselves in every possible way to the Legislature; that they have allowed themselves,

with great satisfaction to themselves, to be brought under the authority of the Local Government Board; and that the Local Government Board have, under the Consolidation Water Acts, taken such course as they conceived to be necessary in the interests of the public. Hence demands have been made upon the Companies, which have been freely submitted to by them, and the result is that all the Committees and the Commissions that have been appointed over a large number of years, although they have had constantly brought before them the desire of different public bodies to usurp the authority which these Companies possess, have always come to the conclusion that the duty which is performed by those Companies has been well performed, that the quantity and quality of the water they have supplied have been unexceptionable, and that no change in the source of supply is advisable. This is an extraordinary point, but it has been reported on, on more occasions than one—both by the Committee of 1867, of which Mr. Sclater-Booth and Mr. Ayrton were members, and also by the Commission over which the Duke of Richmond presided—that it appeared to them, although they had no end of proposals submitted to them, that none of these changes would be in the public interest. Under these circumstances, it is not unreasonable that persons charged with this great work should think themselves much more capable of performing it than the Metropolitan Board of Works; and they say, "Before you submit us to the great expense which appearing before a Committee would bring upon us, you should see that some public result would accrue from such an inquiry." Sir, I hold that there is no public benefit to result from it. First, it appears to me that it is impossible the Metropolitan Board of Works could dispense with any portion of the professional labour which at the present time is employed in giving this most efficient water supply to London. To do otherwise, if they are to set themselves up as a united authority to take the work into their own hands, it would be done much worse than, without their interference, it has been done. Then, in addition, I would point out that the purchase of these works by the Metropolitan Board would result in an annual charge to the ratepayers, equal to the gross amount which is paid in the Metropolis at the present moment, and that, consequently, the public would be subjected to a higher rate for their water than they now pay. Such being the case, it does appear to me, without going further into the matter, that there is a function of the House of Commons to be exercised before the Legislature will consent to hand over these undertakings to the Metropolitan Board—viz., to determine whether the promoters of this Bill can disprove these facts, and also whether they can show that any public benefit will result from the adoption of the plan they propose. I do not want to go into the details of the matter; I want the deputation to have the opportunity of speaking for themselves, and I believe they propose to do so through Mr. Baxter, their parliamentary agent. With these few observations I would impress upon you that it does appear to me there is a great principle which ought not to be passed over very easily—and that is, whether there is not a public demand that the Bill should have a fair discussion, and that the decision should be arrived at on the principle of the Bill, altogether apart from the details of the manner in which the Board want to make the purchase, and the advantages which would accrue if it were made. I do not refer much to the Committee, as proposed by Mr. Fawcett, because I take it for granted such a Committee would be perfectly inadmissible, and that if it was obtained at all, it would be such a Committee as would be chosen after the Bill had passed a second reading.

Mr. Baxter: Sir, Mr. Fawcett's proposition was that there should be a Select Committee. He wanted to take it out of the purview of the regular Committee. He says: "There is no chance of the second reading; let us have a Select Committee to decide two things—first, whether it is expedient to buy; and, secondly, whether the Metropolitan Board are the people who ought to be the purchasers." We looked at that. We did not know whether it would be a Committee appointed by the Committee of Selection; we presumed it would be by the House, and if by the House, it would be in the hands of a Select Committee, and, therefore, very great alarm was felt by the Water Companies. Their undertakings are, as the Metropolitan Board have acknowledged, of the value of some 25 millions of money; the Companies represent themselves as of the value of 30 millions. It is a question, therefore, of property; and the interference with that property, and the rights which are held by the Companies in that property is, and ought to be, a matter of very serious and considerate examination, and not one to be interfered with by a Select Committee, or any other process of the House that is not in the regular course of their administration of justice. We have here 25 or 30 millions worth of property to be disposed of. Now, this is property which has been acquired under parliamentary powers; there is not a Company who have not parliamentary powers. Parliament have settled the capital, settled the terms on which and for which it was created, and the remuneration to which it shall be entitled; and, in 1852, a Committee of Parliament sat most solemnly and inquired into all the processes of the water supplies in London. Again, in 1871, they went into the same question, and laid down regulations to secure the quality of the water and the abundance of the supply, so that it has been a matter fully authorized by parliamentary sanction. What the Board of Works ask is a most serious thing. They ask to take the property of the Water Companies into their own hands. There is a population, not connected with the metropolitan districts in any way, of upwards of 600,000 supplied by these Companies, and the Board are now asking that they might have power to supply water to these large areas upon the terms upon which the Companies are now supplying them. We say particularly that Parliament have laid down the rule that they will not allow any public body to buy out compulsorily a private enterprise, unless the terms are first agreed upon. We held that principle on the two former occasions, when Bills were being brought in. We opposed them on the second reading, and on each occasion, at intervals of three or four years, the compulsory powers were withdrawn before the Bills were read a second time. Parliament have thought it right to fence round property of this description to the extent that a public body shall not take it unless they first agree upon the terms. I was concerned for all the Telegraph Companies when these Companies were purchased, and one of the Post Office authorities came to me to say that he was about to bring in a Bill to acquire their undertakings. I said, "You cannot take them by compulsion." He maintained he could, but I told him, "Until you consent to treat with us, we shall have nothing to say to you; you had better consult your parliamentary agent." In a few days I had a letter from him, saying he would be glad to see me again, and admitted that the principle I laid down was right. In that case the terms were all agreed to before the Bill was brought in to purchase. So with other cases in which it has been proposed to acquire gas and water undertakings, the terms have always been agreed to in the first instance, and what we humbly contend for is this: It is the principle of Parliament never to suffer a public body to take compulsory powers to buy up a company unless they come to an agreement as to the price; therefore, we say this Bill ought not to be read a second time, because that principle is involved in it. The Metropolitan Board have announced, by the report of their Engineers, what they intend to do. They say, "We shall have to pay 25 millions to acquire the Companies, and then we shall have to supplement that by a further, and perhaps an almost equal outlay, to replace the water we buy by other water derived from purer sources." They contemplate, therefore, an outlay of 50 millions of money in acquiring the control of the London water supply. The total gross income of all the Companies is a little over £1,200,000, and if they buy us out at 30 millions, as they can only raise their money at about 4 per cent., the interest on the money would be equal to the gross income of the Water Companies. But out of that gross income, the Water Companies have very nearly half a million to pay for working expenses, so that you see the public would gain nothing; but, on the contrary, would have to submit to an extension of the rates, and of the burden that now lies upon them. There is another difficulty that occurs in connection with the proposal of the Board to buy up the Companies. The payment for water varies exceedingly at present in the different districts. The average charge per head of the population for the whole Metropolis is 6s. 6d. The East London district, from there being a cheaper class of property there, only pays 4s. 6d. per head per annum, while Chelsea pays 8s. 6d., and if the Board's proposal were taken the payment would be, upon an average, 10s. 6d. instead of 8s. 6d. per annum. It would be difficult to preserve those distinctive charges, which arise from the peculiar circumstances of each case, and from the management of the particular Company who have the control of the water supply in each district. The Board say a great sum will be saved by them in the management. The only sum that can be reduced is the Directors salaries, which are limited to £15,000 a year, and saving £15,000, out of working expenses of £500,000, I will not say a word about; in fact, there cannot be any economy arise. They will require the same turncocks, officers, engineers, and superintendents, whether the works are in one hand or in many hands, and that management will have to be divided into as many parts as there are now Companies. Then I may add that the Board's proposal is extremely unpopular. Their districts are in rebellion against them. The St. Pancras Vestry, and other Vestries and District Boards, condemn the course the Board are pursuing. We, therefore, particularly press upon you that, if there is to be an inquiry, the matter is so important, both to the individual owners of the property, and to the public whom they supply with water, that it ought to be one of the most formal character, and that the proceedings of the House should be strictly adopted, and fenced by the rules they have laid down by themselves; that this Bill ought not to be allowed to go to the second reading without the terms being first agreed upon; and that if the promoters will not take the trouble to agree with the parties as to terms, they should not be entitled to go before Parliament with their scheme. They have never made any proposal, or attempted to negotiate terms with us in any way whatever, and we say that no public or private good would accrue, nor would the regular forms of Parliament be observed if this were remitted to any tribunal but to the regular Committee of Inquiry, until after the terms are agreed upon. I may mention, before I conclude, that I understand the Metropolitan Board of Works have stopped all proceedings upon their other Bill. They have not withdrawn it, but they were getting up evidence, and getting the machinery ready for proving their case. They have stopped that, and told the parties to incur no further expense or take any further steps, so that they seem to put the issue upon this Bill. We, therefore, earnestly press upon you that the House should not let this Bill go to a second reading, and much less should a matter so important be referred to a bye-committee—if I may call it such—a Select Committee which would only inquire into the principle whether the water supply of London should be in the hands of one Company instead of the existing Companies, or whether the Metropolitan Board, or any other central body, should be the parties to hold the interests of those Companies. The Metropolitan Board is evidently an institution *in transitu*; they are not a Metropolitan Authority, as taking in the whole of the Metropolis. There are debates every session as to what shall be the future central authority; the Board are not recognized as a permanent central authority, and it would be anomalous to clothe such a body with the absolute control of property valued at 25 or 30 millions of money.

Mr. Cross: I was not quite aware of the nature of the deputation, or I should have had the President of the Local Government Board present. It is impossible for me to speak as to this matter. I understood—but I do not like speaking of other people—that the object Mr. Fawcett had in asking me a question the other evening was rather with the view of seeing whether some stop could not be put to the agitation in this matter one way or the other; because every one will allow it is a matter fraught with manifest evils to which I need not allude—that the question of the purchase of Companies of this kind should be always hanging over the public. I do not want to commit Mr. Fawcett in any way, especially in his absence, but I rather understood that was the motive he had in putting the question to me—whether there might be some practical end put to the question one way or other. I hope I am not mis-stating it.

Mr. Samuda: I think, sir, you are quite right. I think you have in your mind what he said in the early part of this question. He speaks about the very thing you are speaking about.

Mr. Cross: I think that is practically the effect of it. I have had other deputations to me on this question. I had a deputation some time ago relative to the increased charges for water which were being made by the Companies in certain parts of London, the complaint practically being that this increase might be with a view to the ultimate purchase of the undertakings. It is desirable, therefore, for everybody that this question should be set at rest. My simple answer—and the only one I can give to you—is, that I promise before Mr. Fawcett puts the question formally in the House on Monday, that I will consult my colleagues—the President of the Local Government Board and the Chancellor of the Exchequer—as to what answer I shall give. I have not had an opportunity of speaking to them, and I cannot give you an answer to-day. There is not the slightest chance, I think, of the Metropolitan Board of Works Bill being read a second time, or coming on for discussion.

Mr. Samuda: I understand it is put down for discussion for the 9th of May. It is a long time, but I hope, sir, you will not think the Water Companies have done wrong in coming to you.

Mr. Cross: Oh, no; I am happy to see them.

Mr. Samuda: Sir, in answer to what you have said, I had the honour of introducing a deputation to the President of the Local Government Board on this question. He went rather fully, and I think rather favourably into it, and his general views on this matter are in their interest. The Companies only requested me to address these remarks to you inasmuch as the question has been put to you, and inasmuch as they wished to fortify you with their views on the matter before you gave an answer to this question.

Mr. Cross: Perfectly right.

The deputation then withdrew.

Water Gas in America.—The *Polytechnic Review* says: "The local water-gas system lately condemned by the Trustees of the Philadelphia Gas-Works, has been introduced on a much larger scale in Baltimore. The new works have a capacity of producing 1 million cubic feet daily, and the foundations for a plant of equal capacity are laid to meet a probable increase of demand. The Baltimore works will, no doubt, definitely settle the question of the merits of the local system."

SOUTH METROPOLITAN GAS COMPANY.

The Ordinary Half-Yearly General Meeting of the Proprietors of this Company was held at the Bridge House Hotel, London Bridge, on Monday, the 8th inst.—Captain HEATHORN, R.A., in the absence of Mr. Simpson, the Chairman, through indisposition, presiding. The following report and accounts were taken as read:—

The past half year has been one of such uniform prosperity that the Directors have but little to present to the Proprietors in the shape of a report.

There has been a moderate increase in the consumption of gas, which, coupled with comparatively low prices for coals, &c., has resulted in a profit sufficient to maintain the 11 per cent. dividend, to add 1 per cent. to the insurance-fund, and to carry forward a balance to the next half year.

The Directors have reduced the price of gas to 3s. per 1000 feet from Christmas last.

By the Company's Act of Incorporation, one Director retires from office at this meeting, and also one Auditor.

The Director who retires is B. Drew, Esq., who, owing to advanced age, does not offer himself for re-election.

The Auditor who retires is F. Simpson, Esq., who, being eligible, offers himself for re-election.

R. Foster, Esq., has resigned the office of Auditor.

No. 1.—STATEMENT OF SHARE CAPITAL *on Dec.* 31, 1877.

Acts of Parliament authorizing the Raising of Capital.	Description of Capital.	Standard Dividend.	Number of Shares issued.	Nominal Amount of Shares.	Called up per Share.	Total paid up.	Amount not paid up.	Total Amount authorized.
5 Vict., cap. 79	Share.	10 per cent.	4,000	£50 0 0	£50 0 0	£200,000 0 0	..	£200,000 0 0
			4,000	12 10 0	12 10 0	50,000 0 0	..	50,000 0 0
32 & 33 Vict., cap. 130	Do.	Do.	20,000	12 10 0	11 10 0	230,000 0 0	£20,000 0 0	250,000 0 0
39 & 40 Vict., cap. 229	Do.	Do.	..	..	..	..	250,000 0 0	250,000 0 0
						£480,000 0 0	£270,000 0 0	£750,000 0 0

No. 2.—STATEMENT OF LOAN CAPITAL.

Acts of Parliament authorizing Loan Capital.	Description of Loan.	Rate per Cent. of Interest.	Total Amount Borrowed.	Remaining to be Borrowed.	Total Amount Authorized.
32 & 33 Vict., cap. 130.	..	Not exceeding 5 per Cent.	Nil.	£62,500	£62,500 0 0
39 & 40 Vict., cap. 229	..	Ditto.	Nil.	187,500	187,500 0 0
				£250,000	£250,000 0 0

No. 3.—CAPITAL ACCOUNT.

Dr. Cr.

To Expenditure to June 30, 1877	..	£443,899 15 11
Expenditure during half year to Dec. 31, 1877, viz.—		
New buildings and machinery in extension of works	£10,829 18 3	
New and additional mains and services	2,786 12 8	
New and additional meters	1,023 18 9	
	14,640 9 8	
Total expenditure	..	£458,540 5 7
Balance	..	21,459 14 5
		£480,000 0 0

Description of Capital.	Certified to June 30, 1877.	Received since that Date.	Total to Dec. 31, 1877.
By Shares, at £50 each	£200,000 0 0	..	£200,000 0 0
Do., at £12 10s. each	50,000 0 0	..	50,000 0 0
Do., at £12 10s. each, £10 10s. paid £1 on Oct. 1	210,000 0 0	£20,000 0 0	230,000 0 0
	£460,000 0 0	£20,000 0 0	£480,000 0 0

No. 4.—REVENUE ACCOUNT, *for the Half Year ended Dec.* 31, 1877.

To Manufacture of gas—			
Coals, including dues, carriage, unloading and trimming. (See Account No. 9)	£37,735 5 5		
Purification, including £888 5s. 1d. for labour	1,921 5 7		
Salaries of Engineer, Superintendent, and Officers at works	1,061 6 0		
Wages (carbonizing)	8,585 4 8		
Repairs and maintenance of works and plant, materials, and labour—less £204 5s. 3d. received for old materials	6,958 16 6		
		£56,261 18 2	
Distribution of gas—			
Repair, maintenance, and renewal of mains and service-pipes, including labour	£2,144 13 7		
Salaries and wages of officers (including rental clerks)	1,751 8 3		
Repairing and renewals of meters	1,181 3 9		
		5,077 5 7	
Public lamps—			
Lighting and repairing		1,764 11 6	
Rents, rates, and taxes—			
Rents payable	£286 13 2		
Rates and taxes	2,181 12 7		
		2,468 5 9	
Management—			
Directors allowance	£600 0 0		
Salaries of Secretary and Clerks	808 2 6		
Collectors commission	774 1 0		
Stationery and printing	235 2 3		
General charges	569 3 9		
Company's Auditors	50 0 0		
		3,036 9 6	
Law charges		6 6 0	
Bad debts		437 9 1	
Superannuation-fund		438 12 0	
Gas Referees and Official Auditor		78 9 2	
Total expenditure		£69,569 0 9	
Balance carried to net revenue account, No. 5		32,515 5 8	
		£102,084 6 5	

By Sale of gas—			
Common gas (per meter) at 3s. 2d. per 1000 cubic feet	£66,454 7 2		
Less discount	104 10 1		
		£66,349 17 1	
Public lighting and under contracts (see Statement No. 11)		8,027 7 1	
			£74,377 4 2
Rental of meters			1,614 4 11
Residual products—			
Coke, less £1002 11s. 1d. for labour and cartage	£16,595 8 10		
Breeze, less £156 8s. 3d. for labour and cartage	369 15 9		
Tar	4,514 9 9		
Ammoniacal liquor	4,612 16 8		
		25,892 11 0	
Rents receivable			197 8 10
Transfer fees			2 17 6
			£102,084 6 5

No. 5.—PROFIT AND LOSS (NET REVENUE ACCOUNT).

Interest on deposits	£53 2 10	Balance from last account	£37,219 17 4
Amount carried to insurance-fund	4,800 0 0	Less dividend on ordinary capital for the half year ending June 30, 1877	25,300 0 0
Amount carried to reserve-fund	318 2 4		£11,919 17 4
Balance applicable to dividend on ordinary share capital	39,432 7 3	Amount from revenue account, No. 4	32,515 5 8
		Interest on moneys on deposit	168 9 5
	£44,603 12 5		£44,603 12 5

No. 6.—RESERVE-FUND.

Balance on Dec. 31, 1877	£20,636 4 8	Balance on June 30, 1877	£20,000 0 0
		Amount brought from net revenue account	318 2 4
		Half year's interest	318 2 4
	£20,636 4 8		£20,636 4 8

No. 7.—RENEWAL-FUND (LEASEHOLD).

Balance on Dec. 31, 1877	£10,236 16 3	Balance on June 30, 1877	£10,076 5 1
		Interest on amount invested	160 11 2
	£10,236 16 3		£10,236 16 3

No. 8.—INSURANCE-FUND.

Balance on Dec. 31, 1877	£7,894 16 8	Balance on June 30, 1877	£3,047 10 2
		Interest on amount invested	47 6 6
		Amount brought from net revenue account	4,800 0 0
	£7,894 16 8		£7,894 16 8

No. 9.—STATEMENT OF COALS.

Description of Coal.	In Store, June 30, 1877.	Received during the Half Year.	Carbonized during the Half Year.	Used during the Half Year.	In Store, Dec. 31, 1877.
	Tons.	Tons.	Tons.	Tons.	Tons.
Newcastle coal	6,608	58,231	50,721	227	13,891
Cannel coal	1,168	1,811	1,382	..	1,597
	7,776	60,042	52,103	227	15,488

No. 10.—STATEMENT OF RESIDUAL PRODUCTS.

	In Store, June 30, 1877.	Made during Half Year (estimated.)	Used in the Half Year (estimated).	Sold in the Half Year.	In Store, Dec. 31, 1877.
Coke . Chaldrons of 36 bushels.	115	51,642	17,686	30,493	3,578
Breeze do. 36 do.	67	2,672	..	2,429	310
Tar . Gallons	8,775	478,553	1,500	446,006	39,822
Ammoniacal liquor—Butts of 108 gallons, 10-oz. strength	852	11,073	..	9,151	2,774

No. 11.—STATEMENT OF GAS MADE, SOLD, &c.

Description of Gas.	Quantity made, partly measured in Gasholders.	Quantity Sold.			Quantity used on Works, &c., partly estimated.	Total Quantity accounted for.	Quantity not accounted for.	Number of Public Lamps.
		Public Lights and under Contracts (estimated).	Private Lights (per Meter).	Total Quantity sold.				
	Thousands.	Thousands.	Thousands.	Thousands.	Thousands.	Thousands.	Thousands.	
Common	494,474	42,579	419,712	462,291	4,500	466,791	27,683	4,055

No. 12.—BALANCE-SHEET.

To Capital—				By Cash at bankers		£6,835 15 8
For balance, per account No. 3		£21,459 14 5		Amount invested in Three per Cent. Consols—		
Reserve-fund, per account No. 6		20,636 4 8		Reserve-fund	£20,000 0 0	
Renewal-fund, per account No. 7		10,236 16 3		Renewal-fund	10,236 16 3	
Insurance-fund, per account No. 8		7,894 16 8		Insurance-fund	3,094 16 8	
Net revenue account—						33,331 12 11
For balance, per account No. 5		30,432 7 3		Cash in hand for freight, accounts, &c.		1,000 0 0
Sundry tradesmen, for amount due for coals, stores, and sundries. .		7,815 5 2		Stores in hand—		
Deposits by consumers		5,140 18 6		Coals	£13,072 2 10	
Property-tax account		601 19 0		Coke and breeze	1,691 8 0	
				Tar and ammoniacal liquor	1,529 3 3	
				Sundry stores	2,663 1 2	
						18,955 15 3
				Accounts due to the Company—		
				Gas and meter rental, quarter ending Dec. 31, 1877	£49,643 6 3	
				Arrears outstanding	700 6 7	
						50,343 12 10
				For coke and other residual products		2,031 8 0
				Sundries		491 11 11
				Interest		318 2 4
		£113,218 1 11				£113,218 1 11

On the motion of the CHAIRMAN, seconded by Mr. HILL, the report and accounts were received, adopted, and entered on the minutes.

The CHAIRMAN then moved—"That a dividend at the rate of 11 per cent. per annum, for the half year ending the 31st of December last, be now declared and made payable on the 9th inst., and that the warrants be transmitted to the Proprietors by post."

Mr. JENKINS seconded the motion, which was carried.

The CHAIRMAN said he was sorry to announce, and the Shareholders would be all sorry to hear, that Mr. Drew, the Deputy-Chairman, had resigned. He was one of the oldest of the Directors, was in every way a perfectly kind friend to all the members of the Board, and his good temper and pleasant bearing always had a great effect in keeping everything together. He concluded by moving a resolution expressing regret at the resignation of Mr. Drew, and, at the same time, wishing him every prosperity in the future.

Mr. HILL, in seconding the motion, said he did so with a profound feeling of sorrow. Mr. Drew had been on the Board long before he (Mr. Hill) had been, but since they first met in an official capacity they had ever been on intimate relationship. Mr. Drew had always had the interests of the Shareholders at heart, and at the Board had conducted himself in a quiet and gentlemanly way. He was sure they would all feel regret at Mr. Drew's resignation, and that they would cordially agree to the motion proposed by the Chairman.

The motion was put to the meeting, and carried unanimously.

Mr. ROSTRON proposed that Mr. Richard Foster, one of the Auditors, be elected a Director of the Company in room of Mr. Drew. The difficulty he had in speaking of Mr. Foster's merits consisted in the abundance of material he had to deal with. He believed that, as in Mr. Drew's case, Mr. Foster and his family had been connected with the Company from the very commencement. Although their first Act of Parliament was passed in 1842, the Company were formed some eight years previously, and among those gentlemen who formed themselves into an association for the purpose of lighting certain southern parishes with gas, under the title of the South Metropolitan Gas and Coke Company, he thought no less than seven were members of Mr. Foster's family. Of course the Shareholders had latterly been so accustomed to receive a dividend of 10 and 11 per cent. that it was difficult to believe that at one time the Company were a non-dividend paying concern; but such, he understood, was the fact.

The SECRETARY: For a short time.

Mr. ROSTRON said during the first seven or eight years of the Company's existence, he believed, there were many difficulties to contend with, amongst which there was a very serious explosion; but it was fortunate that they then had for a Chairman, Mr. Foster, uncle of the present nominee. He was a gentleman who possessed great energy and ability, and had full confidence in the Company. He battled with these former hard times, and guided the Company safely through them, and that in a way and to an extent which he (Mr. Rostron) thought no other person would have been found to do. Were it, therefore, on the score of gratitude alone, he thought he might confidently ask the vote of every Shareholder on behalf of Mr. Foster. But, apart from that, he had greater claims on their consideration. He had been a proprietor ever since 1836, and was at present, he believed, the largest Shareholder. He thought he was also correct in stating that Mr. Foster had never parted with any of his shares. He was a gentleman possessing a great knowledge of business, and would be able to give to the Company some leisure time; and, having been Auditor, must thoroughly know the accounts. In electing him to the post of Director, the Shareholders would have every guarantee that he would be the right man in the right place, and he felt assured that the Directors would welcome him as a colleague.

Mr. HARRISON seconded the motion. For upwards of 35 years he had known the eminent firm with which Mr. Foster was connected, was personally acquainted with him, and had had ample opportunity of forming an estimate of his character. He was sure that Mr. Foster's large commercial experience, and his high standing in the City of London, must be an acquisition of strength, not only to the Board, but also to the general position of the Company.

The motion was carried unanimously.

Mr. FOSTER, in returning thanks, said that, as far as his abilities would allow him, he should be very happy to do his best to continue the prosperity of the Company. He was, probably, the oldest Shareholder in the room. Looking over some old papers, he saw among them a certificate of some shares registered in his name in the year 1836. The present position of the Company was certainly most gratifying, and he could only hope that the electric light, and all such modern inventions, would do nothing to prevent them continuing to flourish. From what he had seen and heard, he believed that the gas supplied to private customers was the great source of the Company's income, and that it would continue to be so for many years. Nothing was more simple than for people to put a light to their gas; they did not want electricity in their houses. He thought the Company were really in a prosperous condition, built up in a great measure by the past generation. In conclusion, he expressed regret at the absence of the Chairman, through illness. He had presided over many meetings, but age was creeping upon him, as also upon Mr. Drew, who had just resigned his office; and, in the natural course of events, as the Directors grew older, they must make room for younger men.

On the motion of Mr. DONKIN, seconded by Mr. MALTBY, Mr. F. Simpson was re-elected Auditor; and, on the motion of Mr. T. R. HILL, seconded by Mr. HEARNE, Mr. A. Footner was elected Auditor, in room of Mr. Foster.

Mr. SIMPSON, in returning thanks for his re-election, said it was always a great pleasure to him to audit the accounts, which were not only admirably kept, but showed the wisdom, care, and watchfulness of the Directors, and the great energy and skill of the Secretary. He also took occasion to congratulate the Shareholders on the selection they had made of Mr. Foster as a Director, although he could not but regret the loss of so able a colleague. Considering that the Company sold the best and cheapest gas in the Metropolis, and realized 11 per cent., it would be admitted that the Directors were the right men in the right place.

Mr. FOOTNER also thanked the meeting for the compliment that had been paid him in electing him as Auditor.

Mr. BUTLER said he wished to move a resolution. The Directors had been complimented on former occasions for their ability, but the thanks of the Shareholders had never taken a substantial form. Considering that the Company supplied gas so cheaply, and that they had now a capital of £500,000 instead of £250,000, of course there must be a great increase of work, and also an increase of anxiety, and if the Shareholders looked forward to having a certain class of gentlemen on the Board, he thought the Directors ought to be remunerated in proportion, at least, to those of other Companies. Though a few other Companies were charging less than 3s. for their gas, he did not think any other Company were paying 11 per cent.

The SECRETARY said there was one—the Croydon Company—who for one half year paid a little more. But their standard price was 4s. 7d. per 1000 feet.

Mr. BUTLER said that would, of course, account for it. He begged to move—"That the remuneration of the Directors be increased from £1200 to £1800 a year, on condition that the Directors be immediately increased to six." It was thought by some that there was a minimum number of Directors on the Board, and he therefore moved that there should be one additional. The sum proposed would give £300 a year to each of the Directors, which would correspond with the amount of the fees given by the Commercial and other Companies. The Commercial divided £3200 a year between ten. That was £320 each, which was in excess of what he was now proposing; the Phœnix divided £3000 a year between ten, or £300 a year; the London divided £2150 a year between eight, which was £269 each; the Directors of the Surrey Consumers received about £250 each; and the South Metropolitan had hitherto given their Directors £240 each, which sum, he believed, was fixed about eleven years ago. The affairs of the Company had, however, materially changed since then, and he hoped the sum he proposed would not be considered excessive. There was no other Gas Company at present with anything like so small a Board. He thought that, seeing the way in which the Directors had performed their duties, the Shareholders would have no hesitation in passing the resolution unanimously.

Mr. DOCWRA seconded the motion.

Mr. HOBSON did not wish to oppose the allowance, but he should like to have another Director added, which would make seven instead of six. He had been 26 years on the Board of a provincial Company where there were twelve Directors, and the rental and the consumption of coal was very much the same as that of the South Metropolitan Company. He should not object to £2000 being voted if seven Directors were agreed upon.

Mr. BUTLER observed that the Phœnix had only ten Directors, with a capital almost double that of the South Metropolitan. He thought six Directors would be sufficient.

Mr. HOBSON maintained that the position of the Company would be strengthened if they had seven Directors instead of six.

The CHAIRMAN suggested that a trial should be made of six, and if these were found insufficient, another could be added at some future time.

After some further conversation,

The CHAIRMAN put Mr. Butler's motion, which was carried unanimously.

Mr. JENKINS (one of the Directors) said he had looked at the Act of Parliament to see whether the meeting had power to elect an additional number of Directors, because by the Act of 1842, five gentlemen were named as Directors, and provision was made for their going out of office by rotation, and for the re-election of themselves or the election of others in their place in the event of death, or their otherwise becoming disqualified from holding office. It certainly did seem to him a hard thing that a Company should not have the power of increasing their number of Directors if they thought proper, but there was this difficulty. He did not see in the old Act, nor in the Acts of 1869 or 1876, or in the Companies Clauses Act, any provision made to give power to the Company to increase the number of Directors; therefore, the resolution which had been passed ought to be accepted subject to the power of the Shareholders to increase the number. It would be the duty of the Secretary to take the advice of the Solicitor, who would probably

consult Counsel on the matter. He only offered these observations with the view to preventing the Shareholders doing anything which was not strictly and legally within their province. He was bound to say that nothing could be more gratifying to the Directors than the kind manner and tone in which this matter had been discussed, and he was sure it would be a source of great regret to the Chairman that he was absent on an occasion when so many kind things had been said in regard to the Directors.

Mr. JULIAN HILL said that the Directors would all feel grateful for the resolution that had just been passed. Of course the Company must act within their legal limits, but nobody could say that any injustice would be done in adding to the force that had to work such a great Company.

The CHAIRMAN also returned thanks for the substantial manner in which the Shareholders had expressed their appreciation of the services that had been rendered by the Directors. He was quite sure that it was the wish and purpose of every Director of the Company to do everything that he could for the prosperity of the Company, irrespective of all other interests. The Directors did not pay much attention to other enterprises; they were content to stick to their own concern, and to do the best they could for it.

On the motion of Mr. HOBSON, a vote of thanks was cordially passed to the Secretary and Engineer, and other officers of the Company.

Mr. LIVESEY (Secretary and Engineer), in responding to the compliment, said he had always felt himself more in the position of a partner in the concern than of a mere official connected with it. He hoped that the South Metropolitan would continue to maintain, as they had hitherto, the lead of the Metropolitan Gas Companies. The Company were well served by a very efficient staff, and it was necessary for the continuance of the Company's success that such a staff should be maintained.

The proceedings then terminated.

SHEFFIELD UNITED GAS COMPANY.

The Half-Yearly Meeting was held on Monday, the 1st inst.—Mr. F. T. MAPPIN in the chair.

The following report was submitted:—

Your Directors have but little to bring before you in the present report, but they have again the pleasure of submitting to you a satisfactory balance-sheet—viz., that for the half year ending Dec. 31, 1877.

The balance in favour of revenue, shown by such balance-sheet (but which includes a sum of £8348 0s. 9d., brought over from the preceding half year), is £38,253 11s. 3½d.

Your Directors recommend the payment of the maximum half-yearly dividend, and the carrying forward, to the credit of the half year now current, the balance of £14,817 17s. 11d., which will remain after paying such dividend.

Such dividend will be as under:—

Dividend on £135,000 class A stock, after the rate of 10 per cent. per annum	£6,750 0 0
Dividend on £209,053 10s. class B stock, after the rate of 10 per cent. per annum	10,452 13 6
Dividend on £99,700 class C stock, after the rate of 9 per cent. per annum	4,486 10 0
Dividend on 12,937 new ordinary £10 shares (second issue), £3 per share paid up, after the rate of 9 per cent. per annum, being 2s. 8d. and 2-5ths of a penny per share, or	1,746 9 10⅗
Total	£23,435 13 4½

The maximum charge for gas (as you will see by the balance-sheet) was, during the half year, 2s. 1Cd. per 1000 cubic feet. It is now, and since January last has been, only 2s. 9d.

During the half year, amongst other extensions, the mains have been carried forward to the Intake, Hollins End, and Birley Vale, and your Board have now under consideration memorials requesting that they may be laid to Chapeltown and High Green.

The gasholder in the new tank at Neepsend, referred to in the last report, has been completed.

Capital Account, for the Half Year ending Dec. 31, 1877.

Dr.		Cr.	
Class A stock, fully paid up	£135,000 0 0	Land, buildings, parliamentary, and other expenses, works, and machinery (including mains to June 30, 1855)	£424,928 2 8
Ditto B do. do.	209,053 10 0	Mains from June 30, 1855	70,804 6 3
Ditto C do. do.	99,700 0 0	Meters	30,042 2 1
12,937 new ordinary £10 shares (2nd issue), £3 per share paid up	38,811 0 0	Balance	1,762 19 0
Amount raised on mortgage	39,400 0 0		
Calls paid in advance on new ordinary £10 shares	5,573 0 0		
	£527,537 10 0		£527,537 10 0

Revenue Account.

Balance brought from last account	£8,348 0 9	Half year's expenditure in the production of gas	£56,777 7 0
Half year's gas and meter rents, due this day	63,772 2 2	Paid mortgagees & bankers for interest during the half year	597 16 5
Amount arising from the sale of coke, tar, waste lime, and ammonia water	18,264 10 3½	Balance	38,253 11 3½
Amount realized from the manufacture of sulphate of ammonia, sale of gas fittings, and work done (after deducting all charges) and house and other rents	5,244 1 6		£95,628 14 8½
	£95,628 14 8½	Dividends payable April 9, 1878	£23,435 13 4½
Balance brought down	£38,253 11 3½	Balance to be carried forward	14,817 17 11
			£38,253 11 3½

Maximum price of gas for the half year, 2s. 10d. per 1000 feet.

General Balance.

Balance of revenue account	£38,253 11 3½	Ledger balances, and accounts owing to the Company	£57,983 5 5
Ledger balances, and accounts owing by the Company	52,648 17 8	Stores in hand	18,050 15 10½
Balance of capital account	1,762 19 0	Balance due from bankers	16,030 3 7
		Balance due from cashier	1 3 1
	£92,065 7 11½		£92,065 7 11½
Reserve-fund, invested June 30, 1877			£51,958 13 7
Interest to Dec. 31, 1877			873 9 1
			£52,832 2 8

The CHAIRMAN, in moving the adoption of the report, said: Gentlemen, You will find from the report that the balance of profit for the last half year is £29,905 10s. 6d., out of which to pay a dividend of 10 per cent. on the A and B stock, and 9 per cent. on the C stock and the new £10 shares. This absorbs £23,435 13s. 4d., which will leave a balance of profit for the half year of £6469 17s. 2d. This, added to the previous balance of £8348 0s. 9d., will make £14,817 17s. 11d., and this the Directors have carried to the credit of the present half year's account. Our reserve-fund now amounts to £52,832 2s. 8d., and as the highest price that we have charged for gas during the past half year is 2s. 10d. per 1000 feet, we have every reason to be contented with the satisfactory condition of our undertaking. The public, too, I think, have cause to be gratified with the manner in which they are dealt with, for they have had an excellent quality of gas at a very moderate price. The quality has been tested many times, and the tests may be of interest to some of you. In 1876 we made 1811 tests, and the average illuminating power was 16·12 sperm candles. In 1877 there were 1707 tests, and the average quality was 16·45 candles. The Corporation made the following tests:—In 1876 they made 147, and the average quality was 16·04. In 1877 they made 144 tests, and the average quality was 16·56. When you consider, gentlemen, that in the tests made of the Sheffield gas, we use the old 15-hole Argand burner, I think you must come to the conclusion that these tests are very satisfactory. If we were permitted to test the gas by Sugg's patent burner, which is introduced into most of the Acts of Parliament relating to gas that have been passed for some years, we should show that the average quality of the gas in 1876 was nearly 18 candles, and in 1877 the standard would be pretty much the same. When we bear in mind that our average quality has been something like that during the last two years, I think the public have every reason to be satisfied. Our leakage has been reduced to a very small amount. The returns show that upon the gas actually made and actually sold there was a loss of 7·80 per cent., and that includes the gas consumed at the different works of the Company. The new gasholder is finished, and the tank is being filled with water. This operation has been going on during the last ten days, and this morning the Engineer reports that there are 12 feet 10 inches of water in it. Thus, so far, we may consider the holder satisfactory. Contracts for coal have lately been made by the Directors, and they are equally favourable as those made on a previous occasion. The governor-house in Bow Street will shortly be replaced by one which is now being built in Pinfold Street. Your Directors made an exchange of 187 yards of land in Bow Street, and are satisfied to take 100 yards in Pinfold Street, so there can be no complaint of the Directors being very hard with public bodies in that respect. After this meeting is over your Directors will meet to transact their ordinary monthly business; but two special questions will be brought before them which may be interesting to you. One, I believe, will be whether we shall be in a position to make a further reduction in the price of gas. The public certainly will not object to that. The other question is to consider the propriety of creating a new stock, so that we may pay off the mortgage debt existing on the Company; and the amount we are talking about—whether it will be decided upon or not, I cannot say—will be £17 for every £100 share. This, I am sure, will be satisfactory to all of you, and as these two questions are coming up for discussion together, I think it will be wise to decide them, if we can, in the affirmative. I do not know that I have anything further to say, but I cannot sit down without expressing my thanks to Mr. Roberts, our very able Manager, for the efficient way in which he conducts the business of the Company. On all occasions, I am happy to say, I find him equal to his duties, and ever ready and willing to afford me information relating to the business of the Company; and not only to myself, but I am sure that is the opinion of the rest of the Board. I have to move—"That the Directors report now read be approved and entered upon the Company's minutes, and that a copy of the resolutions of this meeting be sent to each Shareholder."

Mr. ROPER seconded the resolution.

Mr. WILSON said twelve months ago he made a complaint about the supply of gas in Snighill and Westbar. The matter had to some extent been remedied, for there was now a better supply of gas, but still the supply was not up to the mark. He was of opinion that new mains were wanted in the centre of the town. Not at this time of the year, but in the winter quarter, the supply was deficient from seven to nine o'clock in the evening; and he thought the deficiency could only be remedied by increased mains. The Shareholders had every reason to be satisfied with the report. A little more than 20 years ago the Company were selling gas at 3s. per 1000, feet and yet had no dividend to declare. They were now selling gas at 2s. 10d., were paying 10 per cent., and were getting together a large surplus besides. As Shareholders they were very thankful; and the town ought to be grateful that gas was supplied at such a price as 2s. 9d., and was likely to be cheaper still. He agreed with the proposal to capitalize the mortgage debt. That course had been resorted to in times past, and he thought it should be resorted to again. Not many of the present members of the Board were Directors during the days of the Company's great struggles; but they still had their champion, Mr. Wake, who had carried them through many difficulties. Before now their meetings were crowded, and their proceedings were carried on amidst the greatest excitement. How great was the change! There was no excitement that day. They were all calm enough, and were quietly waiting to receive their dividends. The Gas Company were not like the Water Company, who could not pay a dividend; or like a number of limited companies whose shares were practically worth nothing. Much of the success of the Company he attributed to their excellent Board of Directors, and he thought the Shareholders ought to be very much obliged to them.

The CHAIRMAN said he remembered the complaint made by Mr. Wilson, and thought it had been attended to. He had inquired of Mr. Roberts, the Manager, as to whether there were any more complaints from the neighbourhood of Snighill with regard to a deficient supply, and he informed him that there were none. Sometimes complaints of this kind were made when the shortness of supply arose from local causes, and not from inadequacy of the mains.

The motion for the adoption of the report was put and carried, and the dividends recommended therein were declared.

A vote of thanks to the Chairman terminated the proceedings.

TOTTENHAM AND EDMONTON GAS COMPANY.—At the half-yearly ordinary general meeting, held on Saturday, the 13th inst., the Directors reported that the business of the Company continued satisfactory. The disposable balance of profit was £3625 19s. 7d., out of which the Directors recommended that a dividend be paid at the rate of 10 per cent. per annum on the original capital, and at the rate of 7 per cent. per annum on the new ordinary capital, amounting together to £3199 3s. 1d., leaving a balance of £426 16s. 6d. to be carried to next account. The Engineer reported that the works continue to be maintained in an efficient condition.

FYLDE WATER-WORKS COMPANY.—The half-yearly meeting was held on the 4th inst., at Kirkham—Mr. F. Kemp in the chair. The report of the Directors stated that "the expenditure on capital account during the six months ended the 28th of February, amounted to £9025 10s. 10d., making the total to that date £175,864 12s. The amount received for water in the same period was £6377 14s. 8d., the working expenses and interest £2580 4s. 7d., ; leaving a balance of £3797 10s. 1d. The receipts for water during the year exceeded by £1000 16s. 4d. those of the previous year. The number of houses supplied increased in that period from 5726 to 6320. The Directors recommend a dividend for the half year at the rate of 6 per cent. per annum, free of income-tax. The Grizedale puddle trench has been executed to the top of the concrete, and the Engineer and three other professional gentlemen all report their opinion that, in consequence of excavations made for the repair of the reservoir bank in 1868, there had been a set of the puddle towards the opening then made, which eventually caused the leakage of December, 1876. Certain steps recommended by the Engineers for the restoration of the bank are now being carried out. The works at Barnacre have not progressed satisfactorily, but are now near completion."

THE LANCASHIRE COAL AND IRON TRADES.

(FROM OUR OWN CORRESPONDENT.)

There is still only a very limited demand for either coal or iron in this district, with a very keen competition for orders, which causes quotations to be weak and irregular, and the actual selling prices are very difficult to ascertain.

Although a little extra demand for the best classes of round coal has been kept up by the recent cold weather, this description of fuel only moves off slowly, and it is probable that the few days stoppages, which are occasionally resorted to at many of the pits, will result in a pretty general adoption of short time during the summer, if the accumulation of heavy stocks is to be prevented. The gas coal trade is just beginning to stir, and one or two contracts are reported to have been settled, but, as yet, there is nothing doing to materially influence the market. Consumers are endeavouring to take advantage of the present depression in trade to secure as long forward contracts as possible at the low prices now ruling in the market. In some instances deliveries extending over five years are asked for, and in the majority of cases they extend over from one to three years, the preference being given to the colliery proprietors who are willing to tender for the longest period. As, however, the prices which are now being accepted cannot, under any possible circumstances, be remunerative, there is not much probability of coalowners entering into very long forward engagements, and I have heard of very few instances where they are disposed to entertain any contract over twelve months. The prices quoted vary very much according to quality, but there are plenty of extremely low offers in the market, and it must be a very good description of screened gas coal that consumers cannot get at the pit mouth for 8s. per ton, or even less. In cannel it is scarcely possible to give any quotation, as prices vary as much as 10s. per ton, according to quality. In other descriptions of fuel the prices quoted at the pit mouth range about as under:—Best Wigan Arley, 9s. to 10s.; common ditto, 7s. 6d. to 8s.; Pemberton four-feet, 7s. 6d. to 8s.; common coal, 5s. 6d. to 6s. 6d.; burgy, 4s. to 5s.; and slack, 3s. to 4s. per ton.

At one or two pits reductions in colliers wages are being made, but no general action has yet been decided upon.

In the iron trade there is little or no change either as regards prices or demand, and producers both of the raw and finished article in all its branches are very short of orders.

THE COAL AND GENERAL TRADE OF THE NORTH OF ENGLAND.

(FROM OUR OWN CORRESPONDENT.)

The coal trade of the North of England showed some little improvement last week. The demand for best gas coals was seasonable, and the shipments to the lower ports of the Baltic, to Sweden and Denmark in especial, have been pretty good. The rates are—Best gas, 7s 6d.; medium, 7s.; and inferior from 6s. to 6s. 6d. per ton. Second-class gas coals are not lower in the quotations, for the reason that coals of this description are shipped for manufacturing purposes. There is a stronger inquiry for best steam coals, and a pretty brisk trade has been transacted to the Mediterranean.

There were large arrivals of sailing vessels in the Tyne and Wear last week. Little ships, which had been freighted by the Gas Companies before they left the South, were loaded forthwith. Most of the small vessels which came to hand were chartered also at previous quotations—viz., 5s. to 6s. per ton East Coast; 6s. 9d. the Channel; and 5s. 9d. London. Bricks to London, 6s. 6d. There has been a good deal of excitement in the foreign freight market within the fortnight.

The iron and manufacturing trades of the Tyne and district, with the exception of iron shipbuilding, are very quiet. The shipments to the Continent are limited.

TRADE NOTES FROM SCOTLAND.

(FROM OUR OWN CORRESPONDENT.)

An extraordinary general meeting of the Shareholders of the Kirkintilloch Gas Company was held on the 1st inst., for the purpose of considering a proposal made by the Police Commissioners of the burgh of Kirkintilloch to purchase the whole works of the Company. After the correspondence with the Commissioners had been read, and the Chairman (Mr. Malcolm Maitland) had fully explained the purpose for which they had been called together, he moved—"That the undertaking of the Kirkintilloch Gas Company, and all the rights, powers, and privileges, and all the lands, premises, works, and other property of the Company, be sold to the said Commissioners on terms to be mutually agreed upon, or to be fixed by arbitration in the manner provided by the Lands Clauses Consolidation (Scotland) Act, 1845." The motion was seconded by ex-Bailie Stephen, and, after a short discussion, unanimously agreed to.

At the last ordinary meeting of the Kirkintilloch Burgh Gas Commissioners a Committee of five members was appointed for the purpose of meeting with the Directors of the Kirkintilloch Gas Company, or any Committee appointed by them, regarding the acquisition of the undertaking of that Company by the Commissioners.

The annual dinner of the Brechin Gaslight Company was held last Wednesday week—ex-Provost Duncan, Chairman of the Company, in the chair—and, in addition to the Directors, there were present a number of the manufacturers of the town and other large consumers. Considerable interest and amusement were afforded by reference to the profits and prospects of the Company, and the likelihood of the gas supply undertaking being taken over by the Municipal Authorities. The prevailing opinion seemed to be that, so long as first-class gas was sold at 5s. per 1000 cubic feet, the Corporation would not make any move to take over the gas-works. It was mentioned that the Company's shares were now selling at £24, the last dividend thereon having been 15s.

At the annual meeting of the Denny Gas Consumers Company a dividend of 7½ per cent. on the ordinary shares was declared, and it was announced that the Directors had reduced the price of the gas from 7s. 1d. to 6s. 8d. per 1000 cubic feet. The Directors specially acknowledged the care and attention bestowed by the Manager, Mr. Scott, on his various duties. A few additional facts may be mentioned regarding the gas affairs of Denny, a town which until very recently could rejoice in having two Gas Companies. Last year a dividend of 5 per cent. was paid by the Gas Consumers Company, the first for 17 years. About two years ago the original £1 shares were selling at 12s. 6d., but their value has since then so much improved that even £1 5s. has lately been refused for them; indeed, it may be mentioned that about five years ago 55 shares were bought for the sum of £5, and sold lately at £1 each. In the year 1875 the price of the gas was 8s. 9d. per 1000 cubic feet, as against 6s. 8d., the price to which it has now been reduced. In the same year the leakage was 32 per cent., and it has now been reduced to something less than 20 per cent.

According to Dr. Wallace's report on the illuminating power of the gas supplied in Glasgow during the week ending the 30th of March, the minimum in the Northern district was down as low as 24·74 candles; and twice during that week the minimum illuminating power was twice under the 25-candle standard in the same district. The maximum in that district during the week was 26·19 candles, and the highest over the week was 28·15 candles, in the western district.

During the week ending April 6, the minimum illuminating power of the Glasgow gas was 26 candles. The average ranged from 26·23 candles to 27·36 candles, the minimum from 26·01 candles to 26·55 candles, and the maximum from 26·49 candles to 28·40 candles.

The Town Council of Dumfries are raising a loan of from £23,000 to £25,000, in order to complete the purchase of the local gas undertaking in accordance with the action lately agreed upon under the Burghs Gas Supply Act.

At the last monthly meeting of the Dundee Gas Commissioners the plans prepared by the Manager for the new workshops, purifier sheds, coal stores, &c., at an estimated total cost of £3522, were approved. It was also reported that the gas-rental for the eleven months ending with March, 1878, amounted to £44,703, as against £43,813 in the corresponding period of 1876-77, or an increase of £890.

On Friday week there were exposed for sale by public auction two Dundee gas annuities for £4 12s. each, and two Dundee water annuities for £12 and £10 respectively. The former were disposed of at 24½ years purchase, and the latter at 24½ and 25 years purchase, respectively.

The Town Council of Selkirk have resolved to request the Directors of the Gas Company to lower the price of gas from 5s. 10d. to 4s. 7d. per 1000 cubic feet.

At the meeting of the Kilsyth Gas Company, on April 5, it was reported that the profits on last year's transactions would enable the Directors to recommend a dividend of 10 per cent., and lay aside the sum of £100 to the reserve-fund. In consequence of the extension of the burgh and building operations lately, new piping has recently been ordered. A new gasholder and other appliances are to be added to the works.

At a meeting of the Police Commissioners of Falkirk on the 8th inst.—Provost Russel presiding—a communication was read from the Directors of the two Gas Companies stating that they would be willing to negotiate with the Commissioners to hand over to them their works, and thus place the arrangements for a supply of gas in the hands of the Authorities. A Committee of the Commissioners was subsequently appointed to consider the letter, make inquiry as to the powers conferred by the Act of Parliament, and report to a subsequent meeting.

The consumption of gas at Rothesay during the month of March was 112,000 cubic feet in excess of the consumption in the same month of last year, and the cost of production was a penny per 1000 feet less.

It is estimated that the new water-works for Port Glasgow will cost £15,330.

The tender accepted by the Ayr Town Council for the construction of the new reservoir at Carcline, the new filter, and the laying of the pipes, amounts to a little less than £5000, which is considerably under the Engineer's estimate. The reservoir is to be five acres in extent, with a depth of 25 feet, and a capacity of 20 million gallons. It has been unanimously agreed to proceed with the works at once.

At a meeting of the Edinburgh and District Water Trustees, last Thursday, it was reported that work to the value of £200,000 had been done in connection with the Moorfoot Water-Works, and authority had been given to pay to Messrs. Leslie, the Engineers, the sum of £1000 on account of commission for the same. Some conversation took place as to the time when water might be expected from Glasshouse Reservoir, now reported as nearly completed. Mr. Leslie reported that he did not expect to have the reservoir filled until next winter—unless, indeed, there should happen to be a wet summer. From Mr. Coyne's monthly report upon the town works, it was shown that the quantity of water sent into the city and district in March was equal to 6077¼ gallons per minute, representing 8,751,312 gallons per day, or 30½ gallons per head per day to the estimated population of 286,800. The supply to Edinburgh was 31 gallons per head per day to a population of 229,872; to Leith, 29 gallons per head per day to a population of 50,870; and to Portobello, 26 gallons per head per day to a population of 6058.

The new water-works for Largs are estimated to cost £10,800, exclusive of the land taken and expense of arbitration. The original estimate of the cost of the Middleton Reservoir was £9902.

At a special meeting of the Hawick Town Council, last Tuesday, Provost Ewen reported that the Public Works Loan Commissioners had agreed to an application that had been made for a loan of £20,000, at a redeeming rate of 4 per cent. for 20 years, for the purpose of carrying out a drainage scheme for the town.

Plans have been agreed upon by the Police Commissioners of Paisley for a drainage scheme for an important district of the town, which is estimated to cost £10,000.

The Glasgow pig iron warrant market closed on Friday afternoon with prices 1½d. per ton under those of the previous Friday. Business in pig iron was decidedly dull during most of the past week.

Dulness continues to be the rule in the coal market, and business seems to be settling down to the summer demand.

TENDERS FOR GAS-WORKS AT DARENTH, KENT.—The following tenders were received for the erection of gas-works for the Managers of the Metropolitan Asylum District, Messrs. A. and C. Harston, Architects, 15, Leadenhall Street; R. Jones, Esq., Consulting Engineer:—

Miller and Sons	£8750
Wilson and Douglas	8246
Porter and Co.	7845
Luke Hook Green	7635
Strode and Co.	7600
Cutler and Sons	6542
Bower (accepted)	6287

WAVERLEY ASSOCIATION OF GAS MANAGERS.—The thirty-first half-yearly meeting of this Association was held at Kelso on the 11th inst.—Mr. Robb, occupied the chair. Mr. Robson, Treasurer and Secretary, read the financial report, and thereafter Mr. Clazy, as a member of the deputation sent by this Association to the West of Scotland Association Meeting which took place at Helensburgh, gave an admirable report of the kind and fraternal greeting they met with from the brethren in the West. Thanks were voted to Messrs. Clazy and Robson for their attention in this matter. Mr. Robson having expressed a wish to be relieved of the duties of Treasurer and Secretary, Mr. Taylor, of Jedburgh, was unanimously elected to the joint offices in his stead. Mr. Robb was elected Chairman for the ensuing year, and the next meeting was appointed to take place at Haddington, on Thursday, the 5th of September ensuing.

SEVENOAKS WATER-WORKS COMPANY.—The annual meeting was held on the 30th ult.—Mr. W. J. Thompson in the chair. The Directors in their report stated that during the past year there had been a steady advance in the business of the Company. About 1000 yards of additional main had been laid, and 46 new premises supplied with water, producing a rental of nearly £115 a year. The accounts showed an actual increase of £87 12s. 4½d. on the water rental, but on account of outlay on repairs, &c., the net profit on the year's working amounted to only £694 14s. 5½d., which added to last year's balance made £909 1s. 6½d. available for dividend. The Directors therefore proposed a dividend of 9 per cent. on the 448 shares issued prior to the last report, and on the 83 shares allotted prior to Dec. 31, 1877. The Company's Bill had passed the third reading. The new works, includ-

ing duplicate set of engines, &c., are in a forward state, and will be ready for use in a few weeks. The Chairman, in moving the adoption of the report, said he believed they would soon be in a position to declare a dividend of 10 per cent. on the capital. In the Bill before Parliament, one of the clauses was to give them an improved capital of £16,000 as against £12,000, the object being to afford the Shareholders a return for the time when they received no dividend at all, and 10 per cent. paid upon the improved capital would be equal to 13 per cent. upon the ordinary capital; he thought that was a state of affairs they ought to be well satisfied with. The report was adopted.

Hull Gas Supply.—Mr. J. Baynes has made the following report on the gas supply in the east district:—"Below are the results of my examination of the gas sent into this district by the Sutton, Southcoates, and Drypool Gas Company, during March:—

	Max.	Min.	Mean.
Illuminating power standard sperm candles	16·82 ..	16·21 ..	16·54
Grains of sulphur per 100 cubic feet . . .	— ..	— ..	15·04
Grains of ammonia per 100 cubic feet . .	— ..	— ..	8·70

Mean barometer and temperature in experiment-room:—Bar., 29·85; Temp., 54·1°."

Quality of the Newcastle-on-Tyne Gas.—Mr. John Pattinson reports the following as the results of his examinations, for the past month, of the quality of the gas supplied to this borough by the Newcastle-on-Tyne and Gateshead Gas Company:—

Date, 1878.	Illuminating Power in Sperm Candles.	Grains of Sulphur in 100 Cubic Feet of Gas.	Sulphuretted Hydrogen.
March 1	15·5	6·95	Nil.
„ 5	15·5	6·34	„
„ 8	14·9	5·94	„
„ 12	15·4	6·29	„
„ 15	15·3	6·91	„
„ 19	15·7	6·69	„
„ 22	15·4	6·59	„
„ 26	15·1	4·99	„
„ 29	14·3	6·26	„

A Sugg-Letheby standard Argand burner is used in testing. According to Act of Parliament, the gas should not be of less than 14 standard candles illuminating power, nor contain more than 17 grains of sulphur per 100 cubic feet of gas.

Spontaneous Combustion of Coal.—At the last meeting of the Manchester Geological Society, Mr. J. Dickinson, Her Majesty's Senior Inspector of Mines, who occupied the chair, spoke at some length on coal combustion, with special reference to the inquiry lately held at Liverpool into the causes of the ignition of coal on shipboard. This question, he remarked, was of much moment to Lancashire, because it had been said that Lancashire coal was especially liable to spontaneous combustion. He, however, pointed out that a great deal of the combustion of coal on board vessels arose from the careless loading more than from the nature of the coal. From what he had seen of the coal in the Lancashire district, he did not believe that there were whole seams which were affected in such a way as to cause them to be specially liable to spontaneous combustion. What was shown by the evidence was that some of the coal that had taken fire on board a vessel had been sent from the Lancashire district; but he had been able to show that, so far as the above district generally was concerned, there was a clean bill of health in this respect. The Assistant-Inspector for West Lancashire had stated that two of the mines in that district were on fire; but he went a little too far in saying that these seams were, consequently, not suitable for export. It was quite possible in a seam of coal that portions of it might be entirely free from liability to spontaneous combustion; but there might be bands of earthy matter, separating the bands of coal, which were liable to it. It was his experience that spontaneous combustion was not so much due to the coal itself as to the intervening bands, and it seemed a very serious matter to denounce one or two seams of coal simply because there might be intervening bands in them which were liable to spontaneous combustion. Whilst he was sitting at the examination, he was much struck with the manner in which ships were loaded at Liverpool. He had pointed out that if people who were accustomed to stock coal in Lancashire were to stock it by dropping it from a great height, as was the case when it was thrown into the hold of a ship, they would not be surprised if spontaneous combustion took place. In loading ships, he recommended that they should commence to build up from the bottom, or else place planks down into the hold. This was a matter which he should like to see gone into by the Society, and he thought there were members who could give them a paper upon it which would be very useful.

Security for Gas-Rates at Chorley.—At the meeting of the Chorley Improvement Commissioners on the 28th ult., it was stated by Mr. Richmond, a member of the Commission, that they were losing a great deal of money through people being supplied with gas and then leaving the town. The Gas Committee, therefore, recommended more stringent regulations, and he moved—"(1) That any person who has previously kept a satisfactory account with the Commissioners and who applies for a new supply of gas, will be accommodated on the usual credit terms. (2) An applicant who has not been a previous consumer, and whose premises are held on a weekly tenancy, will be asked to leave a deposit sufficient to cover one quarter's consumption; after he has been supplied for two years, and the account has been punctually paid, the deposit may be withdrawn, and he will be supplied on the usual credit terms. (3) If the consumer is unwilling to leave a deposit, he may in lieu thereof furnish the Commissioners with a guarantee, signed by any person who has had a satisfactory account with the Commissioners for not less than two years. It will not be necessary that the guarantor should attend personally to sign the guarantee, but a note will be sent to him to inform him that his security has been accepted." Mr. Forrester moved an amendment that it be referred to a special Committee. He thought the Committee had hardly given the question that care and attention which it deserved, inasmuch as he understood that the proposed regulations would affect about 300 persons, who would at once have their supply of gas cut off. He thought some other mode might be found for dealing with defaulters and those who were behindhand in their payments for gas. The Clerk said this was a very important matter indeed, as there was still about £500 outstanding. The Collector, however, had written a very elaborate report on the subject, and he (the Clerk) thought it was absolutely necessary that something should be done to get the money. Persons using the gas without paying for it were really cheating the ratepayers. Mr. Richmond said the Committee had had to forego a large amount of accounts, and he thought if the regulations were carried out they would not lose a penny. Similar regulations were enforced at Birmingham, Blackburn, and other places. Mr. Widdows feared that if the regulations were adopted they would check consumption of gas, for people would use lamps, which would be cheaper. Mr. Eccles (the collector) said he thought there was great room for improvement in the collection. He had frequently to summon persons to the County Court, and even after getting an order they ran away and took their furniture. The motion was then carried.

Direct-Acting Pumps.—At the meeting of the Institution of Civil Engineers, on Tuesday, the 26th ult.—Mr. Bateman, President, in the chair, the paper read was "On Direct-Acting or Non-Rotative Pumping-Engines and Pumps," by Mr. Henry Davey, Assoc. Inst. C.E. The author discussed some new forms of direct-acting pumping-engines and pumps, as a question of relative cost and efficiency, illustrating his arguments by practical examples. The direct-acting engine had a wider sphere of application in mining operations than elsewhere, and experience had proved it to be the best type for deep mine and heavy pumping. Until lately, the Cornish had been the only direct-acting expansive engine. It was a very economical machine, under favourable circumstances, but its range of expansive working was limited. Compound rotative engines had been made to do a higher duty than Cornish engines. In the early days of pumping, Hornblower, Trevethick, Woolf, and Sims experimented with compound Cornish engines in Cornwall, but these attempts had failed because the engines were single acting, and the distribution of steam was such as to lead to great thermal loss from the cooling influence of the condenser. From these and other practical defects the engines fell into disuse. To work direct-acting engines expansively certain conditions were necessary. An inert mass must be provided, which, by its inertia at the beginning and momentum towards the end of the stroke, should compensate for the diminishing pressure of the expanding steam employed in overcoming the almost uniform resistance of the pump. In single-cylinder engines this involved heavy initial strains, considerable piston speeds, and a large inert mass to render a high degree of expansion possible. These obstacles were removed in the direct double-acting compound engine. This part of the subject was graphically illustrated by indicator and velocity diagrams, taken from compound and Cornish engines under various conditions of working, the results being tabulated. The relative cost of compound and of Cornish engines was next compared, and it was shown that the cost of the engine and buildings was less for the compound than for the Cornish engine. The author then described certain improvements in valve gears, and discussed the construction of pumps and pump-valves, advocating much heavier lifts than those commonly used. As examples, a 200-horse power compound engine, employed underground in forcing against a column 1100 feet in height, and a 600-horse power compound engine, actuating two 20-inch plungers by spears, against a column of 700 feet, were referred to. An improved form of pump work was adopted to render such heavy lifts practicable and safe. Twenty varieties of pump-valves were illustrated, and diagrams of the lift of pump-valves, and others showing the shocks produced in the opening and closing of valves, were exhibited. In an addendum the author touched briefly on three questions of special interest in connection with the subject of the paper. These related to the economical use of steam in regard to the degree of expansion, as to how greater economy might be secured, and as to the condition of maximum efficiency.

Register of New Patents.

4115.—Simcox, E., Birmingham, "*Improvements in the manufacture of taps and cocks.*" Provisional protection only obtained. Dated Oct. 24, 1876.

In carrying out this invention the usual chill moulds are employed to produce the plug of the tap, which plug is afterwards used as a core, round which the barrel is cast. In the mould in which the barrel is to be cast is laid round the plug one or more junction-pipes, which are thus cast into the tap simultaneously with the formation of the barrel. As soon as the casting is set, the plug is knocked out, and the cast barrel then sinks slightly, which sinking compensates for the necessary grinding of the plug, and thus allows it to be truly fitted. There is cast upon the small end of the plug the screw-pin ready screwed to receive a six-square nut, and thus the usual drilling or tapping is avoided, and the cock or tap produced without boring or turning, or the use of the lathe at all.

4221.—Lake, W. R., Southampton Buildings, London, "*An improved pressure indicator for taking continuous diagrams.*" A communication. Patent dated Nov. 1, 1876.

This invention relates to an apparatus for indicating pressure, and comprises a small cylinder open at its upper end, and provided with a tubulure and cock for communicating at the bottom with the apparatus containing the steam or gas to be experimented with. A solid piston within this cylinder is controlled or actuated by a spring, and according as the pressure of the gas or steam is greater or less than that of the atmosphere, the piston rises or falls, compressing or extending the spring.

4283.—Gent, J. S., Salford, "*Improvements in apparatus employed in the manufacture of gas-burners.*" Patent dated Nov. 6, 1876.

This invention relates to the apparatus employed in the drilling, facing, and forming of gas-burners. In such apparatus previously constructed the partly-formed burners, or blanks, have been held in tongs by the attendant, or have been singly placed in holders, and moved towards the drill or cutting or shaping tool by the attendant. According to this invention the blanks are fed into an apparatus in which each is seized by a vice or by holding jaws, is adjusted in position in such jaws, and is moved towards the drill or cutting tool, and, after being withdrawn therefrom, is released, the rate of feed towards the tool being determined by the apparatus, and not by the pressure of the hand of the attendant.

4296.—Westinghouse, G., Liverpool, "*Improvements in, and in apparatus for, lighting railway carriages.*" Partly a communication. Application dated Nov. 7, 1876. [Void by reason of the patentee having neglected to file a specification in pursuance of the conditions of the letters patent.]

This invention relates to lighting railway carriages by the combustion, at suitable burners, of the vapour of a hydrocarbon carried in mechanical suspension in a current of air, or hydrocarbon vapour in admixture with air, and has for its main objects to provide a light at comparatively low cost, of high illuminating power, and that without incurring the danger attendant upon carrying hydrocarbon liquids in bulk upon vehicles. By air is meant atmospheric air, hydrogen, or other gas suited for lighting when charged with the vapour of a hydrocarbon.

4379.—Othon, L. P., Victoria Chambers, Westminster, "*Improvements in pumps.*" Patent dated Nov. 11, 1876.

This pump consists of a flexible india-rubber tube inserted along the inside of a segment of a circular frame made of wood or metal. The frame carries an axis, on which are fixed cross-bars, having at their ends rollers, and the working of the pump is produced by turning a handle, which rotates the axis and cross-bars. The rollers at their extremities come in succession against the tube so as to flatten it against the segment of the frame. The segment of the circular frame upon which the tube is, is a little longer than the distance between the rollers, so that the action of the next roller may be brought to bear upon the tube before the other has left or ceased acting. By means of the expulsion of the air from the tube, suction is produced, and the forcing effect is produced by the following rollers acting upon the tube.

4360.—O'Neill, A., Baltimore, U.S.A., "*Improvements in pipe-joints.*" Patent dated Nov. 11, 1876.

This invention has for its object the formation of joints in soil, drain, heater, and other pipes, without the use of hot lead or costly cement, and without lapping the sections. It is specially designed for use in connection with cast-iron pipes, but is not limited in its application thereto.

In carrying out the invention the pipe is constructed in sections, with lugs or flanges on each end, and with a collar encircling the joint, and provided with flanges or lugs, adapted to fit the lugs or flanges on the pipe ends, the ends being drawn together by a rotary movement of the collar. Each section of pipe is constructed with a recessed end for the reception of a gasket, and a spigot end to fit securely on such gasket, and with external lugs or flanges, by means of which the end of one section is held to the gasket on the other by the action of a screw-collar encircling the joint. The pipe sections are further provided with fixed collars, beads, or flanges, to receive pressure from a suitable jack, by which the ends are forcibly pressed together, while the screw-collar is adjusted to hold them.

To adapt these improved couplings for use in connection with a common pipe, or with a short section from which the peculiar recessed or spigot end, as the case may be, has been cut away, detached hubs or coupling ends are provided, adapted to receive and securely pack the cylindrical end of such cut or common pipe, and constructed with either a spigot or recessed end, so as to adapt them to fit either the recessed or spigot end of the next section, as may be required.

APPLICATIONS FOR LETTERS PATENT.

1949.—Cutler, S., Millwall, London, "Improvements in valves." March 29, 1878.

1958.—Adams, A., Narborough, and Coltman, T., Leicester, "Improvements in indicating regulator cocks and valves." March 30, 1878.

1960.—Ker, A. P., Birmingham, "Improvements in apparatus used in the purification of gas." March 30, 1878.

1967.—Cliff, W. D., Wortley, Yorks, "Improvements in the manufacture of furnaces for gas and other works." March 30, 1878.

1999.—Clark, A. M., Chancery Lane, London, "An improved gas lighter." A communication. (Complete specification.) April 2, 1878.

1306.—Hulett, D., High Holborn, Kirkham, T. N., Westminster, and Chandler, S. and J., Newington Causeway, London, "Improvements in apparatus used in the manufacture of gas." (Complete specification.) April 3, 1878.

1313.—Henderson, A. C., Southampton Buildings, London, "Improvements in wrenches or spanners." A communication. April 3, 1878.

1324.—Rolston, W. W., Birmingham, "The diffusion of liquids in the form of spray, the title of which is 'Rolston's Spray Diffuser.'" April 4, 1878.

1333.—Peyton, J. W., Exmouth, and Salmon, J., Exeter, Devon, "A new or improved 'self-measuring' tap or 'meter' tap." April 4, 1878.

1355.—Billing, C. E., Hatton Garden, London, "Improvements in gas-burners and reflectors for heating and warming purposes." April 5, 1878.

1361.—Wheeler, E. G., Strand, London, "Improvements in and appertaining to machinery or apparatus for compressing ammoniacal and other gases, parts of which improvements are also applicable to machinery for compressing air, and to other purposes." April 5, 1878.

1363.—Turner, F. W., St. Albans, Hertford, "Improvements in motor-engines to be worked by water, steam, gas, or other fluids, which improvements are partly applicable to fluid-meters." April 5, 1878.

1366.—Aitchison, A., and Taylor, R. N., Manchester, "Improvements in apparatus and materials for producing gas for illuminating and heating purposes." April 8, 1878.

1391.—Lake, W. R., Southampton Buildings, London, "Improvements in apparatus for measuring water or other liquids." A communication. (Complete specification.) April 8, 1878.

1437.—Lake, W. R., Southampton Buildings, London, "An improved repeating match or igniter for lighting gas, gunpowder, fuses, tinder, and other substances capable of ignition by a flash." A communication. April 10, 1878.

1445.—Morgan-Brown, W., Southampton Buildings, London, "Improvements in regulator valves or cocks." A communication. April 11, 1878.

PATENTS WHICH HAVE PASSED THE GREAT SEAL.

3706.—Annell, O., Stockholm, Sweden, "Improvements in gas governors or regulators." Oct. 5, 1877.

3724.—Alexander, E. P., Southampton Buildings, London, "Improvements in water-filters." A communication. Oct. 8, 1877.

3815.—Gambier, H. C., Paris, "Improvements in gas-stoves." Oct. 15, 1877.

3817.—Hammond, J., Lewes, Sussex, "Improvements in purifying coal gas." Oct. 15, 1877.

3840.—Hastie, J., Greenock, N.B., "Improvements in hydraulic motive-power and pumping apparatus." Oct. 17, 1877.

3870.—Pearn, F. and S., Manchester, "Improvements in steam-pumps, and in valves used for pumping water, air, and other fluids." Oct. 19, 1877.

4432.—Rapieff, J., Middle Street, London, "Improvements in the production and application of electric currents for lighting and other purposes, and in apparatus employed therefor." Nov. 24, 1877.

4825.—Longshaw, J., Warrington, Lancs, "An improved gas-tap." Dec. 19, 1877.

12.—Robinson, H., and Melliss, J. C., Victoria Street, London, "Improvements in the treatment of sewage and impure waters." Jan. 1, 1878.

172.—Alexander, J., Lanark, N.B., "Improvements in engines for compressing air or gas." Jan. 14, 1878.

173.—Hunt, B., Lincoln's Inn, London, "Improvements in the process of and apparatus for superheating steam, and making, heating, and illuminating gas." A communication. Jan. 14, 1878.

233.—Thomas, H., Oldham, Lancs, "Improvements in gas-meters." Jan. 18, 1878.

407.—Hobbs, G. W., Market Harborough, Leicester, "Improvements in pumps." Jan. 31, 1878.

555.—Brown, J., Old Kent Road, London, "Improvements in cocks or valves." Feb. 9, 1878.

PATENTS WHICH HAVE BECOME VOID.

BY REASON OF THE NON-PAYMENT OF THE ADDITIONAL STAMP DUTY OF £50 BEFORE THE EXPIRATION OF THE THIRD YEAR.

1053.—Rawlings, H., "Certain improvements in the construction of filters for the purification of water and other liquids." March 23, 1875.

1209.—Breeden, J., "Improvements in sliding chandeliers and gaseliers." April 3, 1875.

PATENT WHICH HAS BECOME VOID.

BY REASON OF THE NON-PAYMENT OF THE ADDITIONAL STAMP DUTY OF £100 BEFORE THE EXPIRATION OF THE SEVENTH YEAR.

804.—Dover, R., "A mode and means for preventing the flow or passage of sewage into rivers or streams from the sewers, drains, and other channels, and retaining the sewage matters for agricultural purposes." March 24, 1871.

The GRAND MEDAL of MERIT at the VIENNA EXHIBITION, and TWO MEDALS at the PHILADELPHIA EXHIBITION, have been AWARDED to GWYNNE & CO. for GAS-EXHAUSTERS, ENGINES, and PUMPS; Also 27 OTHER MEDALS AWARDED at all the GREAT INTERNATIONAL EXHIBITIONS.

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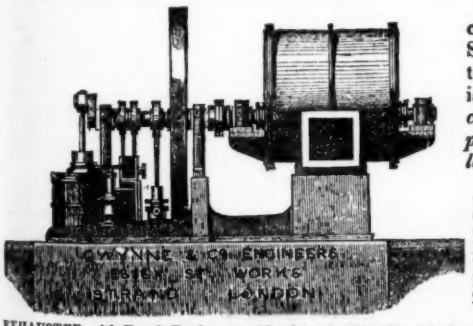
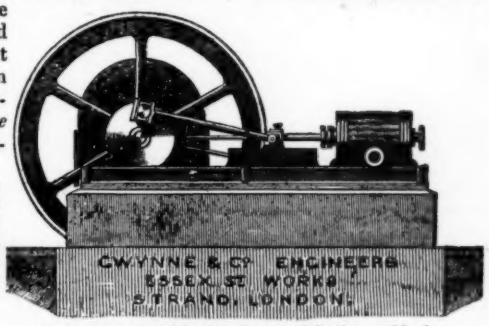


EXHAUSTER with Trunk Engine, capable of passing 210,000 cubic feet per hour.

The Judges report on the combined Exhauster and Steam-Engine exhibited at the Philadelphia Exhibition is—"*Reliable compact Machine, well adapted for the purpose intended, of excellent workmanship.*"

GWYNNE & CO. have made the largest and most perfect Gas-Exhausting Machinery in the world, and have completed Exhausters to the extent of 7,000,000 cubic feet passed per hour, of all sizes from 2000 to 210,000 cubic feet per hour.



52,500 EXHAUSTER, with Horizontal Engine combined.

GWYNNE & CO. do not pretend to enter into a struggle with other makers in respect to cheapness. They have never sought to make price the chief consideration, *but to produce machinery of the very highest quality, and most approved design and workmanship.* The result is that in every instance their work is giving the fullest satisfaction. Numerous testimonials and references can be given to Companies using their Machinery for years past.

Exhausters, with or without Engines combined, can be made to pass the gas without oscillation or variation in pressure. Regulators, Bye-Passes, Stop-Valves, Gas-Valves, Station Governors, and Gas Machinery of all Sizes.

PLEASE ADDRESS IN FULL, GWYNNE & CO., Hydraulic and Gas Engineers, ESSEX STREET WORKS, VICTORIA EMBANKMENT, LONDON, W.C., ENGLAND.

Gwynne & Co.'s New Catalogue on Gas-Exhausting and other Machinery may be obtained on application at the above Address.

TO GAS ENGINEERS.

D. BRUCE PEEBLES & CO.

Beg to call the attention of Gas Engineers to the fact that the novel and original feature in connection with PEEBLES' SYSTEM OF CONTROLLING THE ACTION OF GAS GOVERNORS is the loading or acting on the Bell by Pneumatic Pressure instead of Weights.

TAY WORKS, BONNINGTON, EDINBURGH.

WANTED, a Representative in every large town, for the Sale of Tubes, Fittings, and all kinds of Gas Apparatus.

Address MANUFACTURER, care of Messrs. Dawson and Sons, Cannon Street, LONDON, E.C.

SECRETARYSHIP.—The Advertiser acts as Secretary to one small Gas Company, and is competent to take another, having plenty of spare time, and good offices in the centre of London. The highest references can be given.

Address No. 453, care of Mr. King, 11, Bolt Court, FLEET STREET, E.C.

WANTED.—A gentleman of influence, already calling on Gas Companies, wanted to represent a London firm on Commission. To a first-rate man this will realize a large income.

State full particulars to C. B. S., care of Messrs. G. Street and Co., 30, CORNHILL, E.C.

WANTED, a Working Manager for a small Gas-Works making about 10 million feet per annum.

Application, in writing only, and copies of testimonials to be sent to Messrs. KIRKHAM AND HERSEY, 21, Abingdon Street, WESTMINSTER, S.W.

INSPECTOR.

WANTED, by the Colchester Gas Com-pany, a competent MAN, capable of laying Mains and Services, taking and testing Meters, &c. Must be well recommended. Age between 25 and 30 years. Wages 35s. per week, with house, coals, and gas.

Apply, in own handwriting, with references, &c., to JOHN T. BROWNING, Hythe, COLCHESTER.

WANTED, for the Slough Gas-Works (Bucks), a WORKING MANAGER, who must be conversant with the Manufacture and Distribution of Gas, and with Main and Service Laying.

Preference will be given to candidates who can set Retorts and do the Smithing.

Wages 30s. per week; cottage, coal, and gas found.

Candidates must be able to enter upon the duties immediately—vacancy caused by decease of late manager.

Applications, with testimonials, to be forwarded to Mr. A. THOMAS, Secretary, on or before the 22nd inst.

SECRETARYSHIP.

THE services of an experienced gentle-man are required to take the MANAGEMENT of the London Office of a Provincial Gas Company.

Apply, by letter only, to E. F. WEBB, Esq., Brighton and Hove General Gas Company, 29, St. Swithin's Lane, LONDON, E.C.

WANTED, by a thoroughly practical man, aged 42, a situation as MANAGER of Gas-Works. First-rate testimonials from 1856.

Address No. 454, care of Mr. King, 11, Bolt Court, FLEET STREET, E.C.

WANTED, a situation—Main and SERVICE LAYER, Gas-Fitter (iron and compo.) willing to make himself useful indoor or out—by a married man, aged 24 years. Testimonials and references.

Apply, by letter, to No. 452, care of Mr. King, 11, Bolt Court, FLEET STREET, E.C.

TO CORPORATIONS AND GAS COMPANIES.

A Gentleman of many years experience in the Chemical and Photometrical Examination of Coal Gas, desires an APPOINTMENT. Could fill up his time with Office or other suitable work.

Address No. 451, care of Mr. King, 11, Bolt Court, FLEET STREET, E.C.

WANTED, by Samuel Thompson & Co., Colliery Office, Lancaster, APPLICATION for PRICES from Gas Managers who are prepared to receive Tenders for GAS COAL or CANNEL.

John Leigh, Esq., M.R.C.S., F.C.S., &c., &c., in his analytical report of S. T. & Co.'s Coal, says: "It is remarkable for its purity, I have scarcely ever examined a Coal containing so small a quantity of ash, and when Cannel of the best description is scarce, it may well replace this material."

WANTED, Readers of the Pamphlet, "Cooking and Heating by Gas; on Burners," &c. Copies, by post, Threepence, direct from the Author, MAGNUS OHREN, Gas-Works, SYDENHAM, S.E.

WANTED, to proceed at once to a port in Brazil, a young gentleman who is a competent ACCOUNTANT and BOOK-KEEPER. A knowledge of the Portuguese language and Gas Accounts would be desirable.

Address G. C., care of Housekeeper, 7, Union Court, OLD BROAD STREET, E.C.

TO GAS ENGINEERS AND MANAGERS.

WANTED, by a Retort Setter, an APPOINTMENT, permanent or otherwise; or would take work by the piece. Well acquainted with Plans. Good references.

Address J. C. I., 10, Albert Street, Ryde, ISLE OF WIGHT

WANTED, a gentleman, having a good connection with Gas Companies throughout England to travel, for a Coal Factor.

Address, with full particulars, No. 448, care of Mr. King, 11, Bolt Court, FLEET STREET, E.C.

WANTED, several Thousand Tons of good GAS COKE, in Midland or Northern Counties, in Lots of 50 to 1000 Tons.

Address G. J. EVESON, Gas Coal and Cannel Contractor, BIRMINGHAM.

SPENT OXIDE OF IRON.

WE are open to Buy this in any quan-tity.

Address, with price, to NICHOLSON AND SONS, Chemical Works, Hunslet, near LEEDS.

FOR SALE—A First-Class Station-METER, to pass 20,000 cubic feet per hour. May be seen at work. It is to be disposed of to make room for one of greater capacity.

Apply to E. GODDARD, Gas-Works, IPSWICH.

TO BE SOLD—A complete Apparatus for ascertaining the quantity of Sulphur and Ammonia in Gas, as ordered by the Gas Referees.

For particulars, apply to JONATHAN WILKINSON, Gas Engineer, &c., Grimesthorpe, SHEFFIELD.

GASHOLDER, now at work, and in good condition, FOR SALE; 45 ft. diameter, 18 ft. deep; Six Columns and Girders, with Chains and Balance-weights.

Apply to the Horseley Company, Limited, Tipton, STAFFORDSHIRE.

ON SALE—One Station-Meter, to pass 1000 cubic feet per hour. Almost new. Will be sold cheap.

Apply to J. HALL, Gas-Works, St. Helen's, LANCS.

SULPHATE OF AMMONIA PLANT.

THE above Plant, erected on the newest and most improved method, at less than half the cost of other plans, gives better results, requires less labour, and allows no gases or offensive smell to escape. Reference kindly permitted to manufacturers as to efficiency and cheapness of plant &c.

For particulars, address JOHN G. HARVEY, Chemical Works, Little Island CORK.

BEVERLEY CORPORATION GAS-WORKS.

THE Corporation of Beverley are pre-pared to receive TENDERS for the Purchase of the AMMONIACAL LIQUOR and the surplus TAR made at their Works for the period of One, Two, or Three years, from the 1st day of May ensuing.

Tenders, endorsed "Tender for Tar, &c.," to be sent to me on or before the 25th inst.

For further particulars, apply to Mr. E. Bryan, Manager, Gas-Works, Beverley.

By order,
THOMAS CRUST, Town Clerk.

Guildhall, Beverley, April 3, 1878.

GUILDFORD GASLIGHT AND COKE COMPANY.

THE Directors of the above Company are prepared to receive TENDERS for the Supply of 5000 tons of GAS COAL and 3000 tons of CANNEL. The deliveries to extend to Two years, from April 30 inst.

Tenders, quoting price per ton, delivered free either at the Gas-Works or Railway Station, Guildford, to be endorsed "Tender for Coal or Cannel," and must be delivered on or before April 22nd inst., to Mr. LONGWORTH, Gas Offices, Guildford, from whom any further required information may be obtained.

Gas Offices, Guildford, Surrey, April 5, 1878.

GAS TAR.

THE Directors of the Newton Abbot Gas and Coke Company, Limited, are prepared to receive TENDERS for the Purchase of the surplus TAR made at their Works, for a period of One, Two, or Three years, from the 1st day of May next. The tenders must state the price which will be given per 1000 gallons. The purchasers to find barrels, deliver and remove the same from the Works, after being filled by the Company. The purchase to be paid for quarterly.

Tenders to be addressed to the Secretary of the Company, and delivered on or before the 30th of April next.

By order of the Directors,
JAMES CHAPPLE, Secretary.

Dated, April 6, 1878.

WEST HOUGHTON GAS-WORKS.

THE West Houghton Gas Company are prepared to receive TENDERS for One 12-inch Dry-faced CENTRE VALVE for four Purifiers, the Valve to be delivered at West Houghton Station.

Tenders to be sent to the undersigned, on or befor Thursday, April 25, 1878.

By order,
JOHN PICKUP, Manager.

West Houghton, April 1, 1878.

GLASGOW CORPORATION GAS.

RESIDUAL PRODUCT WORKS TO BE LET, AND RESIDUAL PRODUCTS FOR SALE.

THE Glasgow Corporation Gas Com-missioners are prepared to receive OFFERS for a Lease of their RESIDUAL PRODUCT WORKS at Dawsholm, near Maryhill, and also for the PURCHASE of the TAR and AMMONIACAL LIQUOR produced at their Gas-Works there.

The Lease to be for such term of years, from June 1, 1878, as may be agreed on.

Offerers must offer a fixed Rent of £1200 per annum, and also a further sum in respect of each ton of Coal carbonized at the Dawsholm Gas-Works.

On application at the Gas Office (Manager's Department), 42, Virginia Street, intending offerers will receive orders for inspecting the Works.

The Conditions of Let and Sale may be seen, and forms of offer obtained, on application to the subscriber; and offers will be received by him up till Monday, the 22nd current.

The Commissioners do not undertake to accept the highest or any offer.

J. D. MARWICK, Clerk to the Commissioners.

City Chambers, Glasgow, April 2, 1878.

THE Directors of the Whitworth Vale Gas Company invite TENDERS for the Supply and Erection, at their Works, of one Annular Wrought-Iron CONDENSER, area about 1200 superficial feet, and one SCRUBBER, 40 ft. by 7 ft.

Tenders, accompanied by designs, &c., must be sent to the undersigned, on or before the 23rd inst., from whom any further information may be obtained.

The lowest or any tender not necessarily accepted.

EDMUND LORD, Manager, &c.

Whitworth, near Rochdale, April 13, 1878.

TO MANUFACTURING CHEMISTS AND OTHERS.

THE Directors of the Drighlington and Gildersome Gaslight Company are prepared to receive TENDERS for the Purchase of the whole of the AMMONIACAL LIQUOR produced at their Works, New Lane Bottom, Drighlington, for a term of One, Two, or Three years, commencing the 1st day of July next.

Further information may be obtained on application to the undersigned, to whom sealed tenders, endorsed "Tender for Liquor," must be sent on or before the 7th day of May next.

WM. STANSFIELD, Secretary and Manager.

BEALE'S IMPROVED PATENT GAS EXHAUSTERS

WITH

Wrought-Iron Spindles and ENGINES COMBINED.

SOLE MAKERS,

GEORGE WALLER & CO.

MAKERS OF ENGINES, EXHAUSTERS, INDEX AND DISC GAS-VALVES, HYDRAULIC MAIN VALVES, BYE-PASS VALVES, TAR, LIQUOR, AND OTHER PUMPS, SCRUBBERS AND PURIFIERS, CONDENSERS, BOILERS, &c.

Awarded Silver Medal at the Manchester Exhibition of the Society for the Promotion of Scientific Industry.

Phœnix Engineering Works:

HOLLAND STREET, SOUTHWARK, S.E.

BOLTON CORPORATION GAS DEPARTMENT.

CONTRACTS FOR CANNEL AND COAL.

THE Gas Committee are desirous of receiving TENDERS for CANNEL and BEST SCREENED GAS COAL, for One, Two, or Three years, commencing 1st of July next, to be delivered free at the Bullfield or Craddock Lane sidings of the Lancashire and Yorkshire Railway, at Bolton; or, if carted, at the Gas Street or Lum Street Works, as may be required.

Sealed tenders, endorsed "Tender for Coal," specifying the description of Cannel or Coal, the pits at which they are to be raised, and the quantities proposed to be supplied, to be sent to the undersigned, at or before Ten o'clock a.m., on Monday, the 6th of May, stating also cash terms for monthly payments.

The Committee do not bind themselves to accept the lowest or any tender, but the person or persons whose tender may be accepted will be required to execute an agreement for the due performance thereof.

By order,
R. G. HINNELL, Town Clerk.

Gas Offices, Bolton, April 5, 1878.

THE Directors of the Stratford-upon-Avon Gas Company invite TENDERS for the TAR and AMMONIACAL LIQUOR made at their Works. Quantity of Coal carbonized about 2500 Tons per Annum.

Further particulars may be obtained by applying to
J. S. CRANMER, Secretary.

April 15, 1878.

WIDNES GAS-WORKS.

THE Gas Committee of the Widnes Local Board are prepared to receive TENDERS for the supply of GAS COAL to be delivered at their Works, in such quantities and times as may be required during the One, Two, or Three years commencing July 1, 1878.

Conditions and forms of tender may be obtained from the undersigned.

Tenders to be addressed to the Chairman of the Gas and Water Committee, endorsed "Tender for Gas Coal," and delivered at the Public Offices, Widnes, not later than Thursday, the 2nd of May.

The Committee do not bind themselves to accept the lowest or any tender.

HENRY ROBERTS.

Gas-Works, Widnes, April 9, 1878.

TO TAR DISTILLERS.

THE Directors of the Windsor Royal Gaslight Company are prepared to receive TENDERS for the surplus TAR (about 40,000 Gallons per Annum) produced at their Works for One year, from the 1st of June next.

The party securing the contract will have to pay all expenses of carriage, and keep the Company well supplied with a good stock of sound Barrels.

Sealed tenders to be sent to the undersigned not later than Monday, May 6, 1878, stating price per gallon.

By order,
GEORGE CARTLAND, Secretary.

Victoria Street, Windsor, April, 1878.

WINDSOR ROYAL GASLIGHT COMPANY.

THE Directors of this Company invite TENDERS for the Supply of 5200 Tons of GAS COALS (unscreened), to be delivered free at the Windsor Station of the Great Western Railway, such Coals to be either of the following descriptions—viz., New Pelton, Pelaw Main, or Holmside.

The Contractor to state for which Coals he tenders, as none others than those specified will be received.

The Coals to be delivered as follows—viz., May, 200 tons; June, 300 tons; July, 400 tons; August, 400 tons; September, October, November, and December, 600 tons each month; January, February, and March, 1879, 500 tons each month.

The tenders to be forwarded to me on or before May 6, 1878.

The Directors will not entertain any tender conditional on strikes, &c., or be bound to accept the lowest or any tender.

By order,
GEORGE CARTLAND, Secretary.

Victoria Street, Windsor, April, 1878.

Just published, price Sixpence.

THE LONDON WATER SUPPLY; being an Examination of the alleged Advantages of the Schemes of the Metropolitan Board of Works, and of the Inevitable Increase of Rates which would be required thereby. By a CIVIL ENGINEER.

London: E. AND F. N. SPON, Charing Cross; and sold by SIMPKIN, MARSHALL, AND CO.

BOROUGH OF BIRMINGHAM.

THE Gas Committee of the Town Council invite TENDERS for the Purchase of the whole of the surplus TAR to be produced and manufactured at their works at Adderley Street, Fazeley Street, and Windsor Street, Birmingham, and at West Bromwich; either for a period of One year, or for Three years, from July 1, 1878.

Tenders may be made for the supply from one or more of the works.

Further information and forms of tender may be obtained on application to me,

EDWIN SMITH, Secretary.

Offices of the Department, Old Square, Birmingham.

GEORGETOWN (BRITISH GUIANA) GAS COMPANY, LIMITED.

NOTICE is hereby given that the ORDINARY GENERAL MEETING of the SHAREHOLDERS of the above Company will be held at the Offices of the Company, 30, Gracechurch Street, in the City of London, on TUESDAY, the 7th day of May next, at Three o'clock in the afternoon precisely, to receive the Directors Report and the Accounts of the Company for the half year ending the 31st day of December last, to declare a Dividend, to elect Directors and an Auditor in the place of those retiring by rotation, and to transact the general business of the Company.

The Transfer Books will be closed from the 24th inst. to the 7th of May next, both inclusive.

By order of the Board,
ALFRED LASS, Secretary.

Offices, 30, Gracechurch Street,
London, April 9, 1878.

JAMES NEWTON & SONS,
(Established 1820,)
FIRE-BRICK AND TILE MERCHANTS,
Wholesale and for Exportation,
FALCON DOCK, 78 AND 79, BANKSIDE,
SOUTHWARK, LONDON, S.E.,
DEPÔT for STOURBRIDGE AND NEWCASTLE FIRE-BRICKS, LUMPS, TILES, and FIRE-CLAY, and every Article suitable for
GAS AND WATER WORKS.

Important to Gas Companies and Large Consumers of Paint.

SILICATE PAINTS are now used by the Principal Governments, many of the Gas, Railway, Shipping, and Manufacturing Companies throughout the world. These Goods possess the following great advantages over ordinary Paints:—

Unaffected by Sulphuretted Hydrogen Gas.
Better Colour and Greater Durability.
Non-Poisonous—almost inodorous.
Nearly 50 per cent. Cheaper; 1 cwt. having nearly equal Covering Power of 2 cwt. of Common Paint.
Withstand extremes of Heat that destroy Ordinary Paint.
Practically Indestructible.
No Chemical Action on Metals.
Prevent and arrest Corrosion of Iron.
Do not Soften by Immersion.

SILICATE ENAMEL PAINT is sold ready for use. One coat equal to two of ordinary Paint, and two of varnish. Dries hard, with a beautiful glossy surface, rendering varnish unnecessary. Shields iron from corrosion. No chemical action on metals. Suitable for iron or wood work. May be applied over Tar.

GAS COMPANIES and other **Large Consumers,** who heretofore have used ordinary Paints, are advised to give the Silicate manufactures a trial. By doing so they would find that their annual expenditure for Paint and labour very much reduced, and better quality secured. The use of Silicate Paints reduces the outlay for labour by at least one-half, as fewer coats are necessary, and the work done lasts double the time.

Price Lists, Pattern Cards, and other Information on application to the Sole Manufacturers,

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THE AMERICAN GAS-LIGHT JOURNAL.

A. M. CALLENDER & CO., Proprietors. **G. WARREN DRESSER, Editor.**

Issued Semi-Monthly at No. 42 Pine Street, New York City.

This Journal is especially devoted to Gas Engineering and Manufacture, and is the official organ of the AMERICAN GAS-LIGHT ASSOCIATION, and the NEW ENGLAND ASSOCIATION OF GAS ENGINEERS.

Subscriptions at $3.50 per annum, post paid, to Great Britain, may be made direct by forwarding Post Office Money Order or Draft to the above address. Rates of advertisement, $2.00 an inch. Special rates for larger spaces.

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MANUFACTURED SOLELY BY

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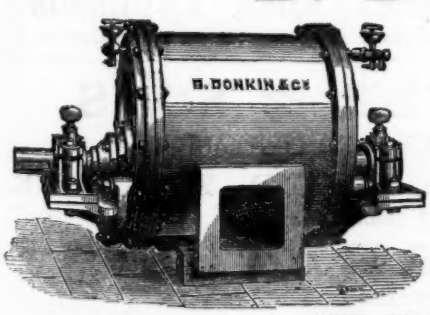

These Exhausters have but one solid slide, which ensures less wear and friction, and thus fewer repairs are necessary. They are made with two outside bearings and with all latest improvements.

MESSRS. B. D. & CO. ALSO MAKE

STEAM-ENGINES FOR DRIVING GAS EXHAUSTERS.
IMPROVED GAS-VALVES.
VALVES FOR AMMONIACAL LIQUOR, TAR, and HYDRAULIC MAINS
VALVES FOR SPECIAL PURPOSES, WITH COLUMNS, SCALES, AND GAUGES.
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BRANCH WORKS, BLACKBURN.

BUYERS OF COAL TAR,
And Crude Products therefrom,
AMMONIACAL LIQUOR, &c.

GRIRDROD'S PATENT
PORTABLE PIPE SCREWING MACHINE,

For 1 in., 1¼ in., 1½ in., and 2 in. Gas Threads, complete £7 10s.
In use at the chief gas-works, and giving great satisfaction.
For other useful goods, see Bailey's "Illustrated Inventions," post free 3s. 6d.; gratis to ledger customers.

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Brassfounders, Gauge Injector and Tool Makers,
ALBION WORKS, SALFORD,
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THOMAS LAMBERT & SONS
MANUFACTURE EVERY DESCRIPTION OF
GAS AND WATER FITTINGS;
ALSO,
WROUGHT-IRON TUBES & FITTINGS.
SHORT STREET, LAMBETH, LONDON.

CLOTH GAS-BAGS FOR MAINS,

As supplied to the Imperial, Chartered, and other London and Provincial Gas Companies. Bellows and Valves for inflating Well Dresses, Stokers Gloves, India-Rubber Suction and Delivery Hose, Gas-Tubing, Leather, India-Rubber, and Gutta-Percha Machine-Bands, Sheet and Washers, and Steam Joints.

T. BUGDEN, Manufacturer,
167, GOSWELL ROAD, LONDON, E.C.

CATHELS'S Patent Gas-Washer is an excellent cleanser of gas from tar, ammonia, sulphur, and carbonic acid, reducing the cost of subsequent purification 30 to 50 per cent. Needs no motive power or attention beyond drawing off and recharging as required. Has no moving parts or complications to get out of order. Is of moderate cost, and is practically indestructible.
Application to be made to the MANUFACTURERS, the Horseley Company, Tipton, STAFFORDSHIRE.

WILSON'S
SAFETY
AUTOMATIC PRESSURELESS DIP-PIPE,
SELF-CLEANING HYDRAULIC MAIN.
See Illustration and Description in JOURNAL OF GAS LIGHTING, *Dec.* 4.

Improved SCRUBBER, with Self-Acting Water Distributor.
Improved HYDRAULIC CENTRE-VALVE to work three or four purifiers.
Improved HYDRAULIC LIFT, by which one man can raise and remove purifier-covers of any size.
Plans and specifications prepared for New or for the Remodelling of existing Gas-Works.
Special Designs for Gas-Works for Tropical Climates.
Particulars, &c., to be had of the Patentee, Inventor, and Manufacturer, W. P. WILSON, Consulting Engineer, 80, Cannon Street, LONDON, E.C.

BELGIAN CLAY RETORTS.
J. SUGG and CO., late ALBERT KELLER, GHENT.—The removal of the import duties on Earthenware permitting the entry of Clay Retorts into England, Messrs. Sugg, of Ghent, beg to draw the attention of the Gas Companies of London, and other Cities, to the very superior quality of the RETORTS manufactured by them. They can be made of any size, in one piece, and of any form. The price will be in proportion to the weight, and very moderate in comparison to their value.
Communications addressed to J. SUGG & CO., GHENT, will receive immediate attention.

JAMES MILNE & SON,
GAS ENGINEERS,
Gas-Meter, Gas Apparatus, and Gas-Fittings Manufacturers,
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Meter Works in London—2, CROSS STREET, WILDERNESS ROW, E.C.

STATION-METERS, GOVERNORS, CONSUMERS METERS, GAS LUSTRES, CHANDELIERS, BRACKETS, &c.,
And every description of Gas-Fittings and Gas Apparatus.

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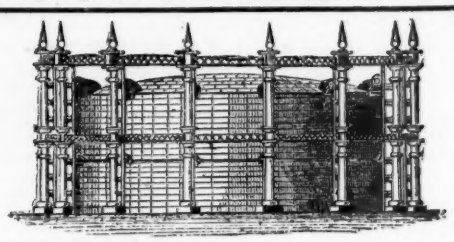

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GAS APPARATUS OF EVERY DESCRIPTION,
Including Improved
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PLUTONIC CEMENT,
For Jointing and Repairing Retorts and Ovens *in* action and *out* of action.
A Pamphlet on the advantages of the above, with modes of Application, References, Prices, &c., *free* by post, from the Sole Manufacturer,
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ENOCH'S PATENT
PORTABLE DRILLING-MACHINE,
Now in use by all the Principal Gas and Water Companies in the United Kingdom.

E Size, for Services in Pipes, 2 to 3 in. bore	£3 10 0
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Drills, 1s. 6d. each.
Machines sent on approval, if desired.
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NOTICE.

THE GAS & WATER COMPANIES DIRECTORY, 1878.

(WATER SECTION.)

The Editor will feel greatly obliged if Secretaries and Engineers would fill up, and return to him at once, the forms sent them, as the work is now going to press. If any have not received Forms, they will be forwarded immediately, on application to the Editor,

CHARLES W. HASTINGS,
8, BUCKINGHAM STREET, ADELPHI, LONDON, W.C.

WILSON CARTER AND PEARSON,
GAS COAL AND CANNEL FACTORS,

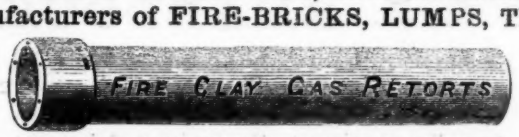
Supply to any Railway Station or for Export all kinds of Fuel for Gas purposes.

Address—CHIEF OFFICES:

TEMPLE BUILDINGS, 50, NEW STREET, BIRMINGHAM.

JOHN HALL AND CO., STOURBRIDGE,

Manufacturers of FIRE-BRICKS, LUMPS, TILES,



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PATENTEE and MANUFACTURER of the following Invention

RETORT SETTINGS—giving great Economy of Fuel.

STEAM-ENGINES and EXHAUSTERS, FOUR-WAY VALVES, WASHERS, SCRUBBERS.

FUEL-MACHINE, for Compressing Breeze and Tar.

N.B.—Pamphlet, with Eighteen Illustrations and Letterpress on the Construction of Gas-Works, post free, 2s. 6d.

PRICES AND ALL PARTICULARS TO BE HAD OF THE PATENTEE,

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GAS PURIFICATION.

BAILES & HALLSWORTH,
CONTRACTORS FOR THE
PURIFICATION OF COAL GAS
BY THEIR
PATENT HYDRATED PEROXIDE OF IRON MATERIAL.

The Material is adapted specially for taking up sulphuretted hydrogen, and will simultaneously absorb any ammonia that may pass the scrubbers.

The spent oxide resulting from our Material is more valuable than that from natural oxide of iron, and manufacturing chemists buy it in preference.

The Material has now been in use during the past three years in most of the principal Gas-Works in Yorkshire and elsewhere.

It contains considerably less moisture than natural oxide of iron, and is much cheaper and more efficient as a purifying agent.

B. & H. are purchasers of Spent Oxide, or will take Spent in exchange for New Material.

FOR SAMPLES AND TERMS, ADDRESS—

BAILES & HALLSWORTH, COPPERAS WORKS, ARMLEY, LEEDS.

Just published,

PAMPHLET ON
DIP-PIPES AND HYDRAULIC MAINS
V.
DESICCATED COAL GAS.
By WM. WHITE,
GAS-WORKS, ABERSYCHAN, MON.

A Copy sent post free for 6½d. upon application to the Author.

Design and Work, March 30, 1878, has the following review of this pamphlet:—"To all connected with the manufacture and distribution of gas we commend a perusal of this sixpenny pamphlet. The author is a thoroughly practical man, and what he has to say he says in a way his 'fellows' can best understand. We venture to predict that by-and-by Mr. White and his pamphlet will be better known than they are now, and probably to the benefit of both producers and consumers of gas."

See also the Editorial Article on "White's Automatic Gas-Valve," in the *Gas Trade Circular and Review* March 29, 1878.

ALFRED LASS,

SPECIAL ACCOUNTANT FOR GAS COMPANIES,
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The Forms of Account, which have been specially designed by A. L. to meet the requirements of the Gas-Works Clauses Amendment Act, 1871, are now in use by many Gas Companies, and have been universally approved.

The above forms are registered.

Water Companies Accounts also prepared and adjusted.

CONSULTATIONS.

T. NEWBIGGING,

CONSULTING GAS ENGINEER,
5, NORFOLK STREET, MANCHESTER.

MR. EDWARD SANDELL,

Associate of the Society of Accountants in England,
Publisher of the
"Gas Companies Expenditure Journal,"
Begs to announce his REMOVAL from Skinner's Place, Size Lane, to
No. 2, ST. GEORGE STREET, WESTMINSTER.

Prices, half bound, cloth sides, 2 quires, 30s.; 3 quires, 36s.; other sizes and bindings to order.

THE
GAS COMPANIES EXPENDITURE JOURNAL,

Being a Ruled Account-Book with Printed Headings, and Analyzing Guide for Keeping, upon the easiest and most correct method, the Expenditure of a Gas Company, in accordance with the provisions of the Gas-Works Clauses Act of 1871, and suitable for all Companies.

Published by EDWARD SANDELL, Accountant, 2, Great George Street, WESTMINSTER, and W. B. KING, Office of the JOURNAL OF GAS LIGHTING, 11, Bolt Court, FLEET STREET, E.C.

Mr. ROBERT DEMPSTER, Sen.,

CONSULTING GAS ENGINEER,
Of Messrs. Robert Dempster and Sons, Rose Mount Gas Engineering Works,
ELLAND, near HALIFAX,

May be consulted on all matters connected with Valuations, Arbitrations, and Parliamentary Applications connected with Gas-Works. Our R. D., Sen., having been engaged on extensive Arbitration Cases, which, combined with his experience in Construction and Contracting, his knowledge of Engineering and Valuations, is both extensive and reliable.

REMOVAL.

CHARLES HEISCH, F.C.S., Analytical and Consulting Chemist, Superintending Gas Examiner to the Corporation of London, &c., &c., has REMOVED from 8, Savage Gardens, to 79, MARK LANE, where he may be consulted as usual.

JOHN ROMANS, C.E., F.G.S.E.,

CONSULTING GAS ENGINEER
AND
CANNEL COAL FACTOR,
30, St. Andrew Square, EDINBURGH.

Plans and Estimates furnished; Gas-Works, Apparatus, Pipes, Machinery, Fire Goods, &c., supplied, or Attested and Shipped for Exportation.

GAS-WORKS TAKEN ON LEASE.

Mr. ROMANS has for upwards of 30 years been practically engaged in the Manufacture of Gas, and has, by extensive experiments, ascertained that by JUDICIOUS INTERMIXTURE of the lighter with the heavier gases, much of the rich Hydrocarbons CAN BE SAVED, which otherwise ARE LOST, during the process of manufacture. He is therefore enabled to give advice to those who favour him with their orders for Cannel, as to the class which will secure for their standard of illuminating power the HIGHEST ADVANTAGEOUS RESULTS.

ANALYSIS AND PRICES FORWARDED ON APPLICATION.

YEO'S PATENT ENGINE PACKING,

Price 1s. 8d. per lb., any size.
Tarred & White Spun Yarn for Pipe Joints, at various prices.
Samples and testimonials free per post.
E. YEO, NEWTON ABBOT.

M. BREMOND'S NAPHTHALINE PROCESS.

All negotiations respecting M. Brémond's patented process for preventing Deposits of

NAPHTHALINE

in Gas Main and Service Pipes should be addressed to Mr. W. H. BENNETT, 22, Great George Street, WESTMINSTER, S.W., or to M. BREMOND, Gas Engineer, Compania Madrilena de Alumbrado y Calefaccion por Gas, MADRID, who may be consulted upon all matters connected with the Gas Industry.

BIRTLEY IRON WORKS,

CHESTER-LE-STREET, DURHAM.

Manufactory for every description of Casting and Machinery for Gas-Works and Water-Works.

Warehouse in London for Cast-Iron Pipes and Connexions of all sizes and in any quantity, Scott's Wharf, Bankside, Southwark.

Agent in London, Mr. J. MANWARING, 101 Cannon Street, E.C.

THOMAS CARR & SON,

MANUFACTURERS OF

FIRE-BRICKS, LUMPS, TILES, RETORTS, &c.,

SCOTSWOOD FIRE-BRICK WORKS, SCOTSWOOD-ON-TYNE.

Also Makers of all kinds of Common Building Bricks, and of Pressed White and Red Bricks for Facing.

TORBAY AND DART PAINT COMPANY, LIMITED.

WORKS:

DARTMOUTH & BRIXHAM (TORBAY) DEVON.

OFFICES:

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SOLE PROPRIETORS AND MANUFACTURERS OF

WOLSTON'S CELEBRATED

TORBAY IRON PAINTS.

TRADE MARK

These Paints have been for many years extensively used in Her Majesty's Royal Dockyards, Woolwich Arsenal, the Shorncliffe and Curragh Camps, War Departments, and Colonies, and are largely supplied to Railway, Harbour, and GAS COMPANIES, Shipowners, Engineering Establishments, Railway Carriage and Wagon Works, and the Paint Trade generally. They are the BEST PROTECTORS of WOOD, CEMENT, and IRONWORK, even arresting corrosion after it has set in; and their base being oxide of iron, they are free from those properties which make lead paints so destructive to iron. They do not scale or blister, are not affected by great heat, and are the only Paints which will resist the effects of sulphuretted hydrogen. Their DURABILITY and covering properties have borne the test of A QUARTER OF A CENTURY'S PRACTICAL TRIAL.

The undermentioned colours—ground in best linseed oil, and requiring only to be thinned down for use in the ordinary way—are kept in stock:—

Torbay Brown.	Torbay Red.
Dart Green.	Slate.
Dart Yellow.	Buff.
Brixham Black.	Torbay Chocolate.
Light Blue.	Cream Colour.
Dart Brown.	Dart Umber.
Imperial Stone.	Light Stone.
Bronze Green.	Salmon Colour.
Navy Green.	Lead Colour.
Carriage Red.	Dark Stone.
Light Lead.	Crystal Palace Blue.
Light Green.	Iron Grey.

All other Colours made to order.

READY-MIXED PAINTS.

A great variety of Colours ready mixed for the brush are also always kept in Stock, in 3 lb., 7 lb., 14 lb., and 28 lb. cans.

Prices and Testimonials on application.

PRICE'S PATENT COKE & COAL BARROW

effecting a great saving of time, labour, and expense.

For particulars, price, &c., apply to Mr. E. PRICE, Inventor and Patentee, Gas-Works, Hampton Wick, MIDDLESEX.

PARIS EXHIBITION, 1878.

MM. SERVIER, MONNIER, ROUGET, Engineers, specially in connection with the industry of Gas Lighting, will undertake to represent any Manufacturers who may be Exhibiting Goods in Classes 27 and 53.

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EDWARD BROOKE & SONS,

HUDDERSFIELD,

MANUFACTURERS OF

GAS-RETORTS, FIRE-BRICKS, &c.

These Fire-Bricks have been used in the erection of Glass Furnaces for Thirty years, and have beaten all others; they do not contract or expand.

SMALL SAMPLE BOX SENT FREE OF COST.

CANNEL COAL.

ELLIS LEVER & CO., Central Coal Offices, 46, Cannon Street, London, E.C., and 6, Piccadilly, Manchester, are prepared to contract for the supply of THE BEST CLASSES of CANNEL and GAS COAL, for long or short periods. Analysis and prices on application.

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CANNEL AND GAS COAL CONTRACTORS,

Shippers of Steam and House Coal

AT ALL

ENGLISH, SCOTCH, AND WELSH PORTS.

46, CANNON STREET, LONDON,

AND

6, PICCADILLY, MANCHESTER.

J. & J. BRADDOCK,

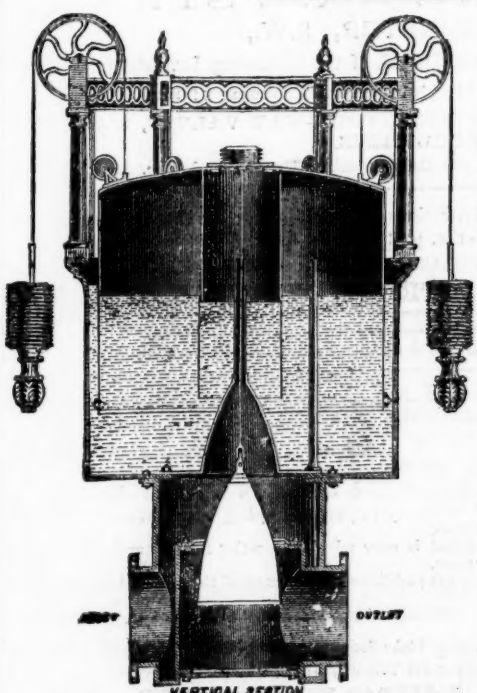
GLOBE METER-WORKS,

OLDHAM,

Beg to submit to Gas Engineers their

PATENT COMPENSATING GAS GOVERNOR,

Which is designed to give an uniform pressure at the Outlet to the Main at all draughts up to the full quantities which the Governors are made to control, such outlet pressure being less than the initial pressure.



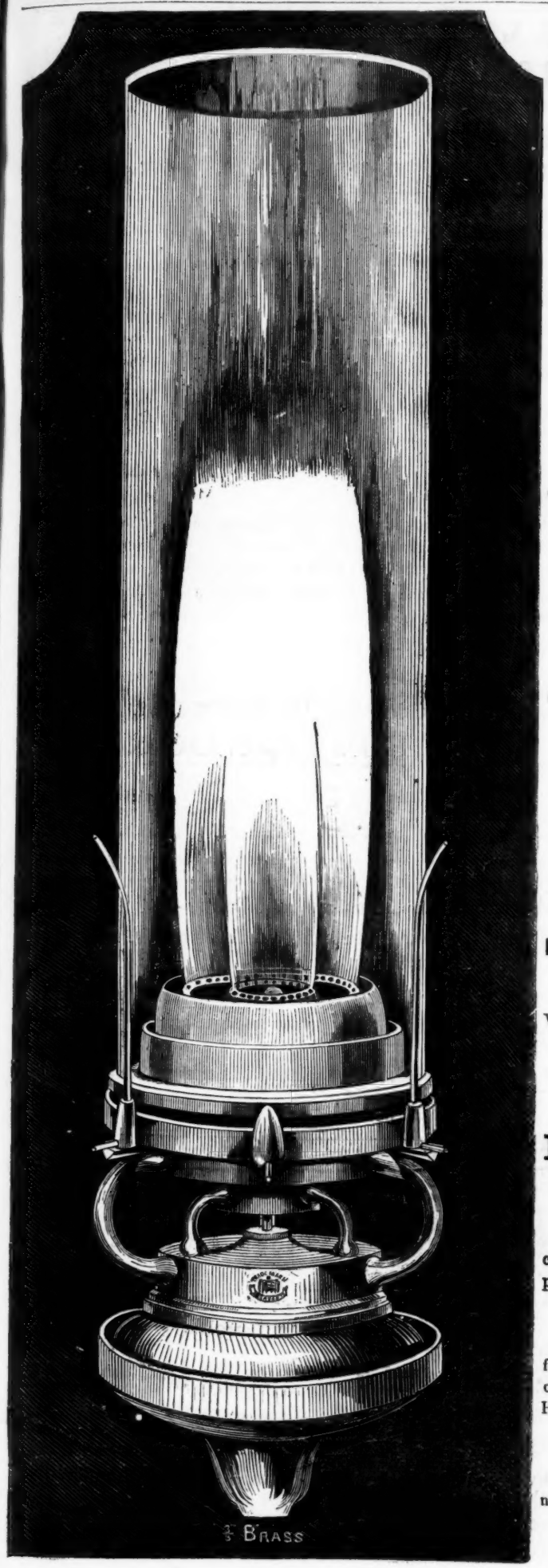
VERTICAL SECTION

The uniformity of pressure is obtained by introducing a compensating chamber into the Bell or Holder of the Governor, which compensator is of the same area as the valve, both of which are operated on by the initial pressure, thereby placing the valve in equilibrium, no matter what the initial pressure may be. The action on the Bell is by the Gas passing along a pipe from the outlet, and the pressure is regulated by weights in connexion with the Bell as required.

From the sectional elevation attached hereto, it will be seen that only the Gas required to operate the Bell comes in contact with the water of the tank, which water will remain comparatively sweet and free from odour. That in case of accident to the Bell, no more Gas can escape than would pass up the pipe covering the valve-rod and Bell supply-pipe.

These Governors have been made and sent out of various sizes for from 2 to 24-inch Mains, and give most satisfactory results.

They can be made with Float in the Bell, or counterpoise as per section.



PARIS, 1867.

LONDON, 1862.

TRADE MARK.

WILLIAM SUGG,

GAS ENGINEER,

VINCENT WORKS, VINCENT ST.,

WESTMINSTER, S.W.

PATENT

"LONDON" ARGAND BURNER,

NEW SIZE, No. NN., DOUBLE FLAME,

With Self-Acting Governor.

LIGHT EQUAL TO 50 Parliamentary Sperm Candles of Six to the Pound.

Will burn any Quality of Gas from 12 to 50 candles, with

A VERY WHITE AND STEADY LIGHT.

Price 18s. each, with Chimney.

☞ **This Burner gives a greater amount of light per cubic foot of gas consumed than any other Burner yet produced.**

It can be used with Albatrine Shade, 20-in. diameter, for large Dining-Rooms or Halls; or with Large Silvered or Enamelled Reflector for Shops or Warehouses; or for Harbour and Signal Lights, Clock-Towers, &c.

The Sizes of the Patent "London" Argand Burner are now as follows:—

OLD SIZES: Nos. A, B, C, D, E, F, G, and H.
NEW SIZES: J, K, and NN.

HALLETT'S
PATENT ANTIMONY PAINT.

MADE ONLY BY

GEORGE HALLETT & CO.,
296, ROTHERHITHE, LONDON, S.E.

This Paint having been in general use over sixteen years (especially in some of the principal Gas-Works), and proved itself the best light-coloured Paint produced for resisting the influence of vitiated atmospheres, it is important that its qualities should be more widely known. Its advantages are that—

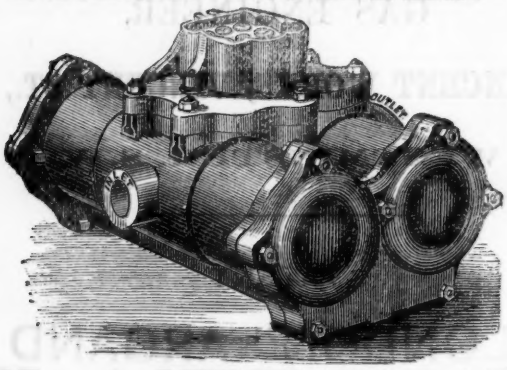
It does not require DRIERS like other Paints.

It does not poison the painter like white lead. No colic by its use.

It has greater durability in colour, as sulphurous gases do not blacken it as they do white lead.

It is of a light stone colour, and has a body equal to white lead, and as its specific gravity is so much less, it covers equally well one-third more surface, by which a great saving is effected; a similar economy arises from its use in steam and gas joints, for which purpose it is superior to white lead.

THE
UNION WATER-METER CO., LIMITED.



The above Company, having purchased the patent rights of the Union Water-Meter, are prepared to receive and execute orders for their Patent Positive Meters, which are simple and compact.

Upwards of 20,000 of these Meters are in successful operation in the principal cities of the United States, and have also been tested and approved by some of the leading Engineers in this country.

For Prospectuses, Prices, &c., apply to the

COMPANY'S OFFICES:

No. 4, NEW BROAD STREET, LONDON, E.C.

THE
STANDARD WASHER AND SCRUBBER.
[KIRKHAM, HULETT, AND CHANDLER'S PATENT.]

Some of the advantages claimed for this Apparatus are as follow:—

The Exposing of a large Amount of Effectually-wetted Surface (which is continually reproduced) to act upon the Gas.

Unerring Regularity in the Distribution of the Liquor.

Saving of Expense in Providing and Exchanging Scrubbing Material—none being required.

Economy of Space, thus enabling the Apparatus to be protected from the Weather.

Economy of First Cost and of Maintenance.

It works without Pressure.

It is particularly adapted for Gas-Works where Sulphate of Ammonia is manufactured.

Applications for Prices, &c., to be made to

Messrs. KIRKHAM & HERSEY, GAS ENGINEERS, 21, ABINGDON STREET, WESTMINSTER.

THE
IMPERIAL METER COMPANY,
LIMITED,

KING'S ROAD, LONDON, N.W.,

OFFICE: 115, VICTORIA STREET, WESTMINSTER, S.W.,

MANUFACTURERS OF

"WET" & "DRY" GAS-METERS IN IRON & TIN-PLATE CASES,

STATION-METERS AND GOVERNORS, STREET-LAMP METERS, BOXES, AND REGULATORS FOR THE AVERAGE METER SYSTEM.

Attention is called to their Dry Meters in Wood Cases, as used by the principal London Gas Companies. These Meters are especially suitable for seaport towns and for export.

The Company repair or convert every description of Wet Gas-Meters to De Castro and Burton's Patent.

WELLS, BIRCH, RYDE, and CO., Limited,

HOYLAND SILKSTONE COLLIERIES,

Near BARNSLEY.

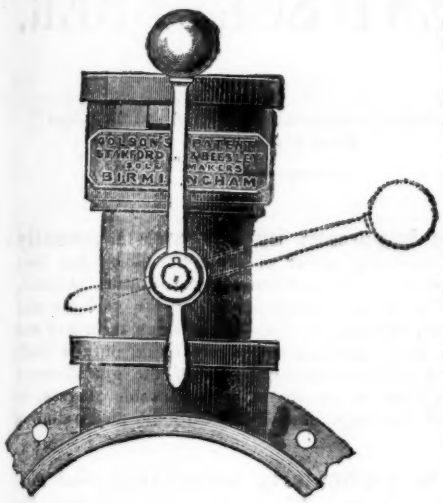
This Company is now in a position to raise **2000 tons per day of REAL OLD SILKSTONE GAS COAL.**

"The quality of this Coal for Gas purposes, if equalled, is not excelled by any on record, and the Coke competes successfully with best Durham."—See *Mining Journal*, Aug. 11, 1877.

Prices quoted to any Railway Station, or F.O.B. Hull, Grimsby, Goole, Keadby, Liverpool, and Fleetwood.

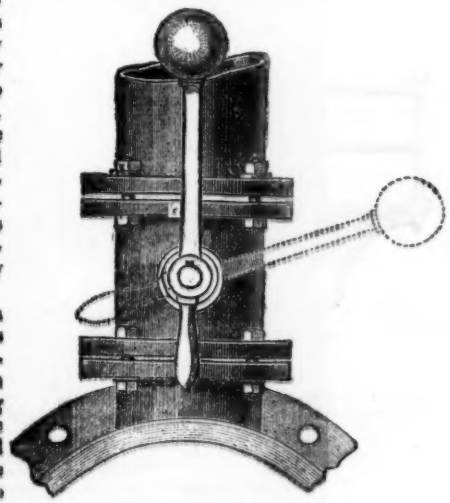
Full particulars will be sent on application to above address.

COLSON'S PATENT ASCENSION-PIPE THROTTLE-VALVE.



THIS Valve is designed to supersede the hydraulic seal, and is intended to be placed immediately in or on the retort mouthpiece, or at such a distance therefrom as to be within reach of the workman. By the use of these Valves, the whole of the pressure is removed from the retorts, and a largely increased make of gas per ton obtained; the deposit of carbon is very slight, choked ascension-pipes are unknown, and the quality of the coke is improved.

When the retort is being drawn or charged, the lever, which is attached to a Spindle and Throttle-Valve, is thrown over as shown by the dotted lines, thereby closing the ascension-pipe; but when the retort is sealed, the lever is placed in a vertical position, and a free way made for the gas to pass to the relieving main.



Upwards of one hundred of these Valves have been continuously at work during the past six months at the Windsor Street Works of the Corporation of Birmingham, and no difficulty has been experienced in working retorts fitted with them in combination with others worked in the usual way with the hydraulic seal.

The following important testimonial has been received:—

Corporation of Birmingham Gas Department, Windsor Street Works, Feb. 17, 1878.

MESSRS. STANFORD AND BEESLEY.

DEAR SIRS,—In reply to your inquiry, I beg to say that the Valves (Colson's Patent) supplied by you in July last have given entire satisfaction. The retorts fitted with them are worked side by side with others having the ordinary dip-pipe, without any difficulty being experienced.

Yours truly, (Signed) CHARLES HUNT.

For further Particulars, apply to

Messrs. STANFORD and BEESLEY,

General Engineers and Sole Makers of COLSON'S PATENT ASCENSION-PIPE THROTTLE-VALVE,

89, DARTMOUTH STREET, BIRMINGHAM.

GAS PURIFICATION

BY

OXIDE OF IRON.

COOKE BROTHERS

ARE NOW SUPPLYING THE BEST IRISH NATURAL OXIDE OF IRON EVER IMPORTED.

Prices, Samples, and Analysis on application to

COOKE BROTHERS, 157, Fenchurch Street, London, E.C.

MESSRS. FLETCHER, BURROWS, & CO.,

Proprietors of the ATHERTON COLLIERIES,

ARE NOW PREPARED TO SUPPLY IN QUANTITY THEIR

BEST ARLEY MINE GAS COAL & GAS NUTS.

Samples of this Coal, which is of unusual excellence, will be supplied for Testing when required.

Prices, with further Particulars and TENDERS *for* CONTRACTS, *supplied on application to*

FLETCHER, BURROWS, & CO.,

ATHERTON COLLIERIES, ATHERTON, NEAR MANCHESTER.

SHIPMENTS MADE AT RUNCORN, GARSTON, BIRKENHEAD, AND LIVERPOOL.

C. & W. WALKER,
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LONDON, E.C.

MANN & WALKERS' PATENT SCRUBBER.

By Letters Patent in Great Britain, Europe, and the United States of America.

By some important improvements recently patented, the purifying power of these Scrubbers has been much increased, and a stronger ammoniacal solution obtained, which is found to absorb a large portion of the carbonic acid contained in gas, effecting an important saving in money and labour in the lime purifiers, and where oxide only is used, the increase in the illuminating power of the gas obtained by these Scrubbers is shown in a remarkable degree, in consequence of the large quantity of carbonic acid removed from the gas.

It is to be particularly noted that the im-portant results of these Scrubbers do not depend upon the machinery alone. The entire internal construction of the Scrubber bears an almost equally important part. For this reason, where it is desirable to convert existing Scrubbers, whose dimensions happen to be suitable, the work commences by ripping out the whole of the interior of the shell, and beginning the internal construction *de novo* from bottom to top.

Fifty million cubic feet of gas per 24 hours are purified from ammonia by these Patent Scrubbers in a winter's day in the gas-works of London, where the purity of gas supply is the highest in the world, under the chemical restrictions of the Board of Trade.

Generally, wherever a high standard of purification is maintained in the chief cities and towns of the British Provinces and of Europe, these Scrubbers have become established.

By their use the department of purification from ammonia upon a gas-works is made complete, without the aid of prepared oxide of iron, chemicals in purifiers, or any other supplementary process, and the whole ammoniacal residual product contained in the coal is absorbed and obtained in the form most profitable to a gas company, while the requirements of all Acts of Parliament and of the Board of Trade, relating to incorporate gas companies, are satisfied.

Foul Gas, properly condensed, entering the inlet is, by once only passing through the Scrubber, completely purified from ammonia with regular certainty day by day, without any further trouble, or any other process, effected by a very small quantity of clear water let into the machinery room at the top of the Scrubber, which is discharged at the liquor outlet at the bottom, from Newcastle coal at about 18 to 20 ounces strength, from Yorkshire and other coals, generally from 25 to 30 ounces strength; while acidulated litmus or turmeric exposed at the Scrubber outlet will not show the slightest discoloration, and there is not a quarter of a grain of ammonia per 100 feet left unabsorbed.

They contain their own engine power, re-quiring only a small inappreciable quantity of steam from the gas-works boiler, and are then complete in themselves, ready for service.

Applications relating to dimensions and prices should be addressed to us, C. AND W. WALKER, 8, FINSBURY CIRCUS, LONDON, E.C., or to Mr. WILLIAM MANN, late Superintendent of the Chartered Gas-Works, BLACKFRIARS, LONDON; they should state approximately the largest make of gas in 24 hours on a winter's day, and the smallest make on a summer's day, to be purified.

AUSTRALIAN BOGHEAD MINERAL.

THE RICHEST GAS PRODUCER IN THE WORLD.

About 400 tons of the above extraordinary Shale have just arrived per *Martha Birnie* from Sydney.

For Terms, Analysis, or Sampling Order, apply to

MORT AND CO., 155, FENCHURCH STREET, E.C.

EDWARD E. CROMBIE & CO.,

INVENTORS AND PATENTEES

OF THE

FRICTIONLESS DRY GAS-METERS,

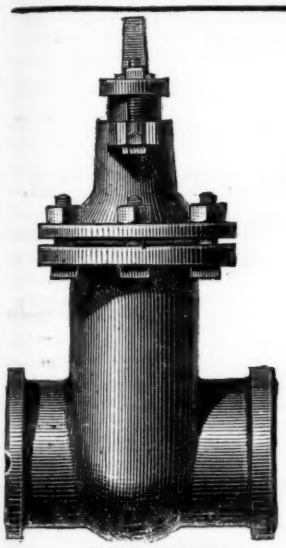
Beg to intimate to Gas Companies and others that they are now prepared to supply these very superior Meters at the same prices as for the ordinary Gas-Meters.

In the construction of this Meter, for which the best tin plates only are used, every mechanical contrivance has been taken advantage of successfully to reduce the friction to a minimum, which is amply proved by the fact that they are made to work upon only one-fortieth of an inch pressure. By an improvement also in their construction, a steadier light is obtained, and greater capacity than can be got from any other Meter in the market. No gas can pass under the valves on any back pressure, as is the case with many other Dry Meters.

To Gas Companies supplying gas through streets with heavy gradients, these Meters are invaluable, as much gas is saved from the low pressure required to work them.

ALL METERS ARE UPHELD FOR FIVE YEARS.

METROPOLITAN WORKS, DIANA PLACE, EUSTON ROAD, LONDON, N.W.



WATER-VALVES.
All Sizes, Flange and Socket, kept in Stock, tested to 1000 feethead.

SIMPSON & COMPANY,

ENGINE-WORKS,

GROSVENOR ROAD, PIMLICO,

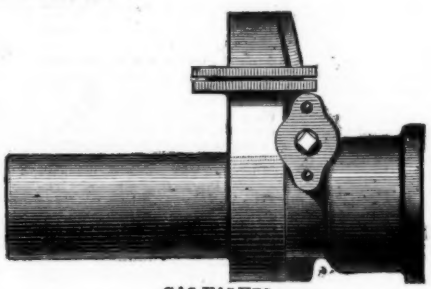
LONDON.

SCREW-COCKS, HYDRANTS,

SLUICES, PENSTOCKS,

And all other Machinery for

WORKS OF WATER SUPPLY, DRAINAGE AND IRRIGATION.



GAS-VALVES.
All Sizes, Flange and Socket, kept in Stock, tested to 100 feet head.

IMPROVED
COMPENSATING GAS-METER.
HUNT'S PATENT.

This Meter supplies a want long felt, by putting an end to the loss sustained by Gas Companies through the overworking of their Meters.

These Meters can now be supplied in either TIN-PLATE or CAST-IRON CASES, and OLD METERS converted to this plan. GAS COMPANIES and CORPORATIONS will find it to THEIR ADVANTAGE to adopt these Meters.

EXTRACTS FROM REPORTS.

"I am able to report that the Meters have given in each test most satisfactory results."—*Mr. H. Sporne, City of London Meter Inspector.*

"I consider the arrangement is a great improvement upon the Meters in present general use."—*Mr. T. Jackson, Meter Inspector, Birmingham.*

"I would observe from the results of my testings that the Meters are a great improvement on the ordinary Wet Meters in general use."—*Mr. H. Airey, Meter Inspector to the Metropolitan Board of Works.*

COPIES OF REPORTS SENT ON APPLICATION.

MANUFACTURED BY

JOHN BENT & SON,

WET AND DRY GAS-METER AND GAS APPARATUS MANUFACTURERS,

BELL BARN ROAD, BIRMINGHAM.

Established 1830.

ROBERT MARSHALL,

CANNEL COAL MERCHANT,

173, ST. VINCENT STREET, GLASGOW.

SHOTT'S BOGHEAD.

LOTHIAN'S CANNEL

Yields 12,500 cubic feet of 34-candle gas per ton, and 9 cwts. of excellent coke, containing only 4 per cent. of ash.

MUIRKIRK, No. 1, CANNEL

Yields 12,160 cubic feet of 32·5-candle gas per ton, and 10 cwts. of excellent coke, containing only 5 per cent. of ash.

OLD WEMYSS CANNEL

Yields 13,320 cubic feet of 32·5-candle gas per ton.

Prices and full Analyses on application.

GAS COAL.

POPE & PEARSON, LIMITED, have now the authority of several of the most eminent Gas Engineers of London in stating that their Coal yields *in practical working over* 10,000 *cubic feet of gas, with an illuminating power of* 16 *candles;* or by the standard burners now used by the London Gas Companies, an illuminating power equal to 17½ candles.

One ton yields 12½ cwt. of good coke. This Coal can be shipped from Hull, Goole, Liverpool, Morecambe, and Barrow.

For further particulars, apply to POPE AND PEARSON, LIMITED, West Riding and Silkstone Collieries, near LEEDS.

SCOTCH CANNEL COALS.

The Subscriber is prepared to contract for the supply of all the principal SCOTCH CANNEL COALS. Prices and Analyses of the various Coals will be forwarded on application.

JAMES M'KELVIE,

CANNEL COAL MERCHANT,

HAYMARKET, EDINBURGH.

Established 1840.

HEBBURN MAIN GAS COALS.

T. Stone, Esq., of Weymouth, writes on Nov. 17, 1876: "I have used about 12,000 tons of this Coal, with, I think, the best possible results, although not always under the most favourable circumstances. My Coal account made up to Midsummer last showed a makeage of 10,524 cubic feet per ton of 14¼-candle gas, and not a hundredweight of Cannel used. This statement would, I know, be incredible to many men, and may provoke the remark, 'How much of it is paid for?' For the gratification of such, I have to say that, of the above quantity, 9866 cubic feet per ton of Coal carbonized were brought to charge and duly paid for, with the exception of about 6s. per cent. for bad debts. The coke is of excellent quality. The above facts I hold to be a greater recommendation to your Coal than any words of mine could be."

PRICES ON APPLICATION, EITHER F.O.B. OR BY RAIL IN TRUCK LOADS.

THE TYNE COAL COMPANY, LIMITED, OWNERS.
W. RICHARDSON, Fitter,
29, QUAYSIDE, NEWCASTLE-ON-TYNE.

LESMAHAGOW CANNEL COAL.

FERRAND DAVIES,

148, GRESHAM HOUSE, OLD BROAD STREET, LONDON, E.C.,

SOLE AGENT FOR

THOMAS BARR'S LESMAHAGOW MAIN CANNEL.

Quotation and Analysis forwarded on application.

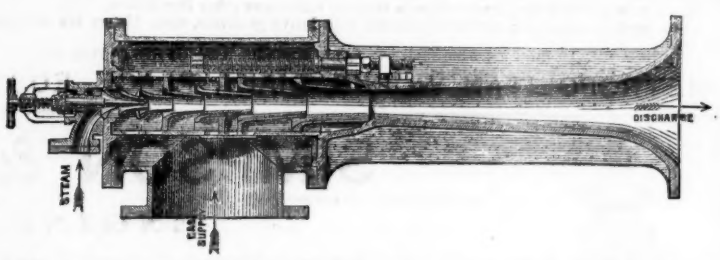
MIDLAND & YORKSHIRE COMPANY,

COAL OWNERS AND FACTORS,

Supply to any Railway Station the best descriptions of Gas Coal, Nuts, and Cannel.

PRICES ON APPLICATION.

HEAD OFFICE: 79, MARK LANE, LONDON.



KÖRTING'S STEAM-JET GAS-EXHAUSTER.

IMPROVED CLELAND'S PATENT.

UPWARDS OF 250 IN USE.

CLELAND'S PATENT CONDENSER AND STEAM SCRUBBER.

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OR TO

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SOLE AGENT FOR ENGLAND AND WALES.

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Supply the Best Wigan Arley Mine Gas Coal, Gas Nuts, Gas Cannel, &c.

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GAS COAL

Of superior quality, delivered in trucks at any Railway Station in England, or shipped on board at Hull, Grimsby Docks, or Barrow-in-Furness.

Purified gas per ton of coal in cubic feet (average)	**10,262**
Illuminating power in candles	**15·86**
Weight of coke in lbs. per ton of coal	**1,502**

ANALYSIS AND PRICES ON APPLICATION TO

Mr. EDMUND TAYLOR, Secretary,

ALBERT COLLIERY, NEWBOLD, NEAR CHESTERFIELD.

THE SILKSTONE & DODWORTH COAL & IRON COMPANY, LIMITED,

DODWORTH, BARNSLEY.

BENJAMIN WHITWORTH, Esq., M.P. . . . . Chairman.
Mr. RICHARD HARTLEY . . . . . Managing Director.

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The above Company are raising nearly a thousand tons of the Real Old Silkstone Gas Coal per working day.

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HYDRATED PURIFYING MATERIAL.

Samples on application.

MESSRS. SPENCE BROS., LIMITED,

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And to treat, by Purchase or Exchange, for Spent Oxide.

PRICES ON APPLICATION.

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July 2, 1877.

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The various descriptions of Gas Coal produced from the above Collieries possess an unequalled reputation, combining in a large degree the constituents essential for the production of the best quality of Coke and Gas of a high illuminating power.

A recent extensive development of the Collieries enables us to offer increased supplies.

JAS. PATERSON, Esq., of Warrington, after testing various qualities of our Coal, has sent the following testimony of their merits:—

"MESSRS. NEWTON, CHAMBERS, AND CO.,

"Warrington Gaslight and Coke Company, Offices, Mersey Street, Warrington, April 23, 1877.

"GENTLEMEN,—After carefully testing the various samples of Gas Coals sent from your Collieries for analysis, I have pleasure in reporting them as belonging to the highest class of Gas and Coking Coals.

"The average of Nine samples gives a yield of **12,500** cubic feet of **15½**-Candle Gas, being equivalent to **664** lbs. of sperm per ton, and **1420** lbs. of fixed carbon of a very superior quality. All the samples bear a close relation to each other in value.

"Yours truly, "JAMES PATERSON."

Full particulars will be sent on application to us—address as above.

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PRIZE MEDALS.
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METERS, BOXES, REGULATORS, AND ALL REQUISITES FOR PUBLIC LIGHTING.

TESTING APPARATUS for all purposes relating to Gas, &c.

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STATION-METERS, ALL SIZES, up to 15 feet Square, with PLANED JOINTS;

Experimental Meters, Photometers, Pressure-Gauges, Governors, Test Holders, &c., &c.

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Effecting an IMMENSE SAVING in the cost of discharging Coals from Vessels, Barges, &c.

HYDRAULIC RAMS FOR LIFTING AND LOWERING PURIFIER COVERS.

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